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DIVISION OF THE
STATE GEOLOGICAL SURVEY
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URBANA

REPORT OF INVESTIGATIONS — NO. 46

ILLINOIS MINERAL INDUSTRY IN 1936

A Preliminary Statistical Summary and Economic Review

BY

WALTER H. VOSKUIL, ALMA R. SWEENY AND W. A. NEWTON

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URBANA, ILLINOIS
1937

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ILLINOIS MINERAL INDUSTRY IN 1936

A PRELIMINARY STATISTICAL SUMMARY AND ECONOMIC REVIEW

WALTER H. VOSKUIL, ALMA R. SWEENY AND W. A. NEWTON

INTRODUCTION

THIS REPORT, which presents the fundamental statistics on the distribution and consumption of the major mineral products of the State, is made possible through the cooperation of the United States Bureau of Mines, the U. S. Bureau of the Census, through the active collection and publication of coal statistics by the Illinois State Department of Mines and Minerals, and through the generous cooperation of the mineral producers of the State in responding to requests for information.

The quantity and value of mineral output in Illinois in 1935 and 1936 is shown in table 1.

Illinois coal production reached a total of 50,000,000 tons in 1936, the first time since 1930. During the same period recovery of coal production was not as pronounced in other leading coal producing states. In Pennsylvania, production in 1936 was 109 million tons compared with 124 million in 1930; in West Virginia, production was 117 million tons compared with 121 million previously, and Kentucky dropped from 51 million to 48 million.

Petroleum production in 1936 was slightly higher than in 1935 and conditions in the oil industry at the end of the year show that production in excess of market needs no longer threatens the stability of prices.

Demand for fluorspar has been exceptionally active due to the great increase of steel mill operations and conditions point to a continued high demand through 1937.

Agricultural limestone is enjoying a substantial increase in market demand. Improved prices for farm products and the need for replenishing lime requirements of the soil have revived this market.

TABLE 1.—SUMMARY OF PRODUCTION AND VALUE OF ILLINOIS MINERALS, 1935-36

	1935		1936	
	Amount[c]	Value	Amount[c]	Value
Coal	44,525,469	$69,516,000	50,526,000	$78,820,560
Pig iron	2,224,132	39,092,488	2,917,016	53,614,754
Clay products	.....	6,820,145	.....	11,513,411
Coke	1,668,523	9,628,162	2,082,516	13,098,787
Cement, Portland (barrels)	3,276,970	4,500,897	4,949,318	7,056,344
Sand and gravel (total)	8,354,473	4,276,342	12,418,495	6,017,468
Structural sand	1,158,015	454,427	1,776,853	741,682
Paving and road-making sand	901,428	387,925	1,134,658	428,225
Glass sand	470,546	554,322	536,873	628,345
Molding sand	465,871	439,194	687,384	591,756
Railroad ballast sand	411,333	118,811	411,725	99,915
Grinding, polishing and blast sand	115,293	367,302	151,530	439,601
Engine sand	45,809	25,820	67,344	34,455
Fire or furnace sand	[a]	[a]	[a]	[a]
Other sands	144,585	108,851	191,359	178,231
Structural gravel	1,376,076	613,573	1,988,747	882,543
Paving and road-making gravel	2,312,064	908,718	4,155,618	1,597,485
Railroad ballast gravel	822,589	250,416	1,298,602	388,612
Other gravel	130,864	46,983	17,802	6,618
Petroleum (barrels)	4,322,000	4,810,000	4,445,000	5,467,350
Limestone (total)	4,387,350	3,217,319	8,576,510	6,813,505
Road metal and concrete	2,965,050	2,106,582	6,823,140	5,427,112
Flux	336,240	175,567	393,760	219,829
Railroad ballast	389,650	257,572	568,570	376,009
Rip-rap	214,220	213,880	181,600	180,383
Rubble	39,610	43,948	340	609
Agriculture	349,690	246,935	1,081,600	846,227
Other uses	92,890	172,835	185,500	185,336
Rock wool	.....	.....	.....	190,000
Mineral paints, zinc, and lead pigments	[a]	1,224,407	[a]	[a]
Natural gasoline (gallons)	2,642,037	140,589	[b]	[b]
Natural gas (m.cu.ft.)	1,448,000	844,000	.....	.....
Lime (total)	117,602	878,746	144,675	1,057,765
Building	17,077	146,202	21,005	173,912
Tanneries	[a]	[a]	12,930	96,235
Metallurgy	35,219	234,075	53,951	361,609
Paper mills	8,230	46,201	8,240	45,210
Other uses	57,076	452,268	48,549	380,799
Fluorspar	44,120	685,794	82,056	1,525,606
Quartz (silica)	66,492	370,488	82,877	483,952
Clay (raw)	98,912	281,352	126,396	278,996
Tripoli	10,001	113,484	10,981	138,063
Lead and silver	.....	37,142	.....	28,427
Sandstone	18,400	12,869	25,400	30,952
Zinc	.....	.....	.....	.....
Pyrites	9,091	.....	9,472	15,660
Total value		101,113,903		119,438,059

[a] Included in other uses.
[b] Not available.
[c] In tons, except as noted.

The construction industry with its demand for glass, clay products, cement, sand, gravel, and stone is improving but has not yet reached the point where it is meeting the needs for adequate housing facilities. A sustained demand for building materials may be anticipated for several years.

The establishment of several new rock wool manufacturing plants and the inauguration of commercial production is the outstanding development of new mineral production in 1936.

A summary of mineral production in 1935 and 1936 is presented in table 1.

COAL

Review of production.—Illinois maintained its position as third in the list of coal producing states in 1936. The long standing competition between northern and southern coal fields of the United States shows some interesting comparisons when the trends in Pensylvania and Illinois among northern fields are compared with West Virginia, eastern Kentucky, and western Kentucky among southern fields. Pennsylvania, for many years the leading state in bituminous coal output, has been replaced by West Virginia. Pennsylvania in 1936 supplied 25.0 per cent of the total bituminous coal output, West Virginia 27.1 per cent, Illinois 11.7 per cent and eastern Kentucky 9.0 per cent. The western Kentucky field, which is an important competitor of Illinois coal fields, has lost considerably since 1929, production dropping from 14,437,000 tons in 1929 to 8,420,000 tons in 1936, a loss of 41.7 per cent. In this same period, Illinois fell from 60,658,000 tons to 50,526,000 tons, or a loss of 16.7 per cent. In the meantime, Pennsylvania lost 24.4 per cent of its output, whereas West Virginia lost only 15.2 per cent. West Virginia and eastern Kentucky continue to be the most important competitors of the older mining districts in both Pennsylvania and Illinois.

Production of coal in the United States and in Illinois for 1934-1936 is shown in table 2.

TABLE 2.—SUMMARY OF COAL PRODUCTION, 1934-36[a]

(Thousands of net tons)

Year	United States	Illinois	Illinois per cent of total
1934	359,368	41,272	11.5
1935	372,373	44,525	12.0
1936	434,070	50,526	11.6

[a] U. S. Bureau of Mines, Minerals Yearbooks 1934 and 1935; Bituminous Coal Tables 1935-36.

In addition to coal supplied by Illinois and by competing fields in the eastern and southeastern states, there is a considerable production of coal in Iowa, Missouri, Kansas and western Kentucky. Production in these states in 1935 and 1936, together with a comparison of 1929 production is shown in table 3.

TABLE 3.—COAL PRODUCTION IN STATES OF THE ILLINOIS COAL MARKET AREA, 1929, 1935 AND 1936 [a]

(Thousands of net tons)

State	YEAR		
	1929	1935	1936
Western Kentucky	14,437	8,134	8,420
Iowa	4,241	3,650	3,550
Kansas-Missouri	7,006	6,332	6,650
Total	25,684	18,116	18,620

[a] U. S. Bureau of Mines, Minerals Yearbooks 1934 and 1935; Bituminous Coal Tables 1935-36.

Production in states west of the Mississippi River remains fairly constant and probably represents consumption in a local market which cannot be displaced by more distant coals with higher freight costs. Production in western Kentucky, however, has fallen approximately 40 per cent since 1929. Shipments from this district into the Illinois coal market area must overcome the handicap of higher freight rates and, since the readjustment of wages in the Illinois-Indiana district in 1932, has lost some of its market.

Output of coal, by classes of mines.—Table 4 shows by classes the number of coal mines in operation (exclusive of product of wagon mines producing less than 1,000 tons), the total output, and the percentage of total output of each class for the years 1933-1935. Data for years from 1919-1924 is shown in Report of Investigations No. 25 and for 1925 to 1932 in Report of Investigations No. 36.

Strip-mined coal in Illinois.—Coal mined by stripping methods showed a substantial increase in 1936. The record from 1932 is given in table 5.

Production of coal by shipping mines in Illinois by counties and months for 1936 is shown in table 6.

Distribution of coal.—Table 7 gives a summary of all-rail revenue coal (exclusive of railway fuel) shipped into the Illinois coal market area in 1935 and 1936.

TABLE 4.—NUMBER AND PRODUCTION OF COMMERCIAL COAL MINES, CLASSIFIED BY SIZE OF OUTPUT, 1933-35 [a]

(Exclusive of product of wagon mines producing less than 1,000 tons)

Year	*Class 1A*	*Class 1B*	*Class 2*	*Class 3*	*Class 4*	*Class 5*	Total all classes
	(*Thousands of net tons*)						
	Over 500	200–500	100–200	50–100	10–50	Less than 10	
Number of mines							
1933	24	35	20	38	84	413	614
1934	24	38	21	36	98	567	784
1935	26	41	15	47	96	497	722
Production by classes (*Thousands of tons*)							
1933	17,616	11,130	2,910	2,622	1,943	1,193	37,413
1934	19,288	12,570	3,111	2,539	2,382	1,382	41,272
1935	20,372	14,549	2,153	3,525	2,548	1,350	44,525
Percentage of output by classes							
1933	47.1	29.7	7.8	7.0	5.2	3.2	100.0
1934	46.7	30.5	7.5	6.2	5.8	3.3	100.0
1935	45.8	32.7	4.8	7.9	5.7	3.0	100.0

[a] U. S. Bureau of Mines, Minerals Yearbook, 1936.

All rail shipments into the Illinois coal market area from all fields increased from 42,524,649 tons in 1935 to 49,210,336 tons in 1936, or a rise of 15.7 per cent. Shipments from Illinois to this same territory increased from 22,325,370 tons to 25,929,656 tons, or an increase of 16.2 per cent.

A notable feature of the all-rail movement in 1936 is the heavy increase in shipments from the Hazard and Harlan fields of eastern Kentucky into Chicago. Shipments from these fields rose from 1,950,545 tons in 1935 to 2,897,445 tons in 1936, or an increase of 48.5 per cent.

TABLE 5.—STRIP-MINED COAL IN ILLINOIS, 1932-36 [a]

Year	Output, tons	Per cent of total output
1932	6,551,301	19.6
1933	5,624,632	15.0
1934	6,160,083	14.8
1935	7,410,087	16.6
1936	8,557,135[b]	17.0

[a] Compiled from Monthly Reports on Coal Production, Illinois State Department of Mines and Minerals, Springfield, Ill.

[b] Preliminary figure.

TABLE 6.—BITUMINOUS COAL PRODUCTION BY SHIPPING
(Net

County	January	February	March	April	May
Christian	388,975	482,328	322,619	297,770	269,183
Clinton	56,537	59,542	19,610	9,275	4,331
Franklin	1,027,938	1,170,626	737,175	518,221	382,227
Fulton	248,713	218,364	193,667	161,233	120,288
Henry	51,858	46,442	45,566	51,133	39,656
Jackson	176,968	172,698	133,983	120,140	93,629
LaSalle	37,494	42,496	19,341	23,918	17,499
Macoupin	423,828	443,649	370,871	261,552	273,768
Madison	201,368	190,018	122,797	110,714	61,825
Marion	52,164	38,717	37,894	36,217	16,598
Montgomery	69,537	71,679	36,526	32,453	13,129
Peoria	137,714	141,899	132,949	77,925	82,092
Perry	413,836	388,000	264,873	221,827	195,002
Randolph	69,353	81,614	42,757	32,689	24,352
Saline	446,952	415,212	318,844	230,807	139,124
Sangamon	318,950	311,814	181,072	175,153	126,892
St. Clair	289,384	329,087	169,289	149,999	98,771
Tazewell	21,576	18,746	12,765	12,480	6,862
Vermilion	200,211	217,797	146,391	161,866	111,213
Washington	48,853	47,752	30,171	5,600	4,636
Will	[b]	[b]	[b]	[b]	[b]
Williamson	286,015	293,943	222,106	181,320	135,047
Woodford	13,973	14,158	[b]	[b]	[b]
Other counties	244,820	245,111	171,878	151,160	117,516
Total	5,227,017	5,441,892	3,733,144	3,023,452	2,333,640
Strip mines	883,071	816,664	667,969	597,469	496,084
Shaft mines	4,343,946	4,625,228	3,065,175	2,425,983	1,837,556

[a] Compiled from Monthly Reports on Coal Production, Illinois State Department of Mines and Minerals, Springfield, Ill.
[b] Tonnage included in that of "Other Counties."

MINES IN ILLINOIS BY COUNTIES AND MONTHS FOR 1936 [a]
tons)

June	July	August	September	October	November	December	Final report
284,267	359,586	308,849	350,031	469,389	433,049	522,488	4,488,230
4,523	6,696	9,025	14,586	40,788	38,677	34,072	297,662
435,902	623,178	731,903	721,094	957,076	982,025	1,141,262	9,428,627
134,226	140,184	140,740	193,922	261,659	274,222	333,173	2,420,391
38,621	46,957	45,803	45,455	57,708	51,253	54,102	574,554
125,021	154,726	125,645	149,847	165,607	156,757	192,377	1,767,398
13,756	14,065	21,689	24,031	29,040	34,997	35,804	314,130
301,333	303,886	314,674	304,666	393,994	393,149	465,023	4,250,393
67,547	67,903	79,911	107,580	159,185	143,792	159,439	1,472,079
19,878	20,940	27,394	25,914	33,415	40,538	48,791	398,660
21,802	21,682	37,865	33,228	70,058	75,805	116,955	600,719
83,009	75,299	86,336	91,750	118,942	124,366	154,527	1,306,808
208,892	190,066	227,043	252,131	330,422	324,203	437,568	3,453,863
20,257	21,491	17,347	24,564	44,358	45,232	51,792	475,806
138,165	161,902	228,521	249,107	401,879	417,400	505,984	3,653,897
153,974	153,045	202,359	186,370	261,461	269,679	331,862	2,672,631
89,146	108,583	144,817	182,792	267,428	224,288	282,047	2,335,631
6,235	6,840	15,611	15,452	16,752	15,283	17,263	165,865
137,216	114,818	125,283	146,695	200,372	200,116	239,566	2,001,544
18,569	18,757	21,286	13,705	29,146	37,530	50,089	326,094
97,697	107,357	111,492	114,419	143,195	130,363	193,427	1,428,634
162,570	178,058	195,027	206,169	269,426	249,633	293,003	2,672,317
[b]	[b]	[b]	[b]	9,369	10,712	10,493	58,705
24,945	31,394	44,264	64,365	68,495	68,828	62,816	741,742
2,587,551	2,927,413	3,262,884	3,517,873	4,799,164	4,741,897	5,733,619	47,329,546
539,510	546,246	557,449	635,573	847,469	866,921	1,102,710	8,557,135
2,048,041	2,381,167	2,705,435	2,882,300	3,951,695	3,874,976	4,630,909	38,772,411

TABLE 7.—ORIGIN AND DESTINATION OF REVENUE RAILROAD SHIPMENTS (Exclusive of non- (Net

From	Chicago, Illinois	Illinois, other	Milwaukee, Wis.	Wisconsin, other	Council Bluffs, Iowa
1935					
Western Pennsylvania	51,515	45	.....	647	.....
Altoona, Somerset-Meyersdale and Cumberland-Piedmont	45,379	5,471	372	5,403	733
Fairmont (W. Va.)	11,825	4,159	.....	940	.....
Northern and Eastern Ohio	929	.....	.....	1,098	.....
Southern Ohio	1,762	87	.....	228	.....
Kanawha (W. Va.), Logan and Kenova-Thacker (W. Va.-E. Ky.)	718,957	104,602	1,879	42,616	1,230
New River–Winding Gulf and Pocahontas-Tug River	6,379,274	378,286	122,155	534,217	98
Northeast Kentucky and McRoberts	793,829	122,093	1,180	35,982	.....
Virginia	116,018	15,855	43	34,288	.....
Hazard, Harlan, and Southern Appalachians	1,950,545	342,080	2,130	46,306	834
Ex-River Coal	470	.....	.....	.....	.....
Northern Illinois	461,974	1,877,469	1,132	83,978	.....
Central and Southern Illinois	5,659,803	6,440,315	47,765	1,043,677	46,533
Indiana	2,859,975	1,032,359	72,820	418,830	153
Western Kentucky	603,154	357,087	1,720	285,069	6,180
Total	19,655,409	10,679,908	251,196	2,533,279	55,761
1936					
Western Pennsylvania	55,839	2,014	.....	103	.....
Central Pennsylvania, Somerset–Myersdale and Cumberland–Piedmont	40,504	6,081	453	11,044	810
Fairmont (W. V.)	34,188	8,945	92	2,861	.....
Northern and eastern Ohio	4,088	1,148	.....	859	.....
Southern Ohio	6,772	87	.....	588	.....
Kanawha, (W. Va.), Logan and Kenova-Thacker (W. Va.-E. Ky.)	963,093	119,137	2,849	41,501	1,186
New River-Winding Gulf and Pocahontas-Tug River	7,311,836	415,003	162,999	660,394	46
Northeast Kentucky and McRoberts	1,027,008	113,871	619	50,535	103
Virginia	81,644	16,583	1,270	48,159	.....
Harlan and Hazard (E. Ky.)	2,897,443	405,341	1,974	55,508	440
Northern Illinois	561,007	2,163,494	1,920	133,652	103
Central and southern Illinois	6,321,257	7,379,486	42,230	1,096,765	62,131
Indiana	3,056,707	1,164,091	85,704	378,049	194
Western Kentucky	509,608	353,782	3,352	200,396	7,238
Total	22,870,994	12,149,063	303,462	2,680,414	72,251

[a] U. S. Bureau of Mines, Monthly Coal Distribution Reports.

FROM ILLINOIS, INDIANA, AND KENTUCKY, AND FROM THE APPALACHIANS [a]
revenue railroad fuel)
tons)

Iowa, other	St. Louis, Mo.	Kansas City, Mo.	St. Joseph, Mo.	Missouri, other	Kansas, other	Nebraska, other	Minnesota	South Dakota	North Dakota
				1935					
271	.....	.....	.....	.....	.....	.....	296	.....	.....
5,261	3,412	1,050	339	2,362	1,662	1,393	4,750	1,313	.....
2,073	.....	.....	.....	.....	.....	.....	843	201	.....
5,907	.....	.....	.....	.....	.....	.....	75	40	.....
3,800	.....	.....	.....	.....	.....	.....	447	.....	.....
195,376	64,248	.....	.....	2,493	.....	442	20,919	2,089	.....
86,619	75,307	.....	.....	1,078	83	115	141,361	15,671	.....
172,292	138,189	.....	.....	1,130	.....	729	27,991	3,174	.....
4,340	.....	.....	.....	.....	.....	.....	8,786	952	.....
474,453	7,606	.....	.....	2,089	.....	1,695	47,237	7,531	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
376,410	479	.....	.....	240	.....	235	64,658	625	.....
1,503,507	3,067,025	4,606	33,267	892,121	19,387	130,938	435,626	121,804	1,796
401,107	47,996	152	.....	2,804	.....	3,494	134,936	10,413	181
299,576	86,135	50	.....	66,584	.....	14,322	58,114	26,957	4,531
3,530,992	3,490,397	5,858	33,606	970,901	21,132	153,363	946,039	190,770	6,508
				1936					
913	.....	.....	.....	.....	.....	.....	59	.....	.....
8,398	3,359	1,106	388	2,099	1,740	1,349	5,836	1,296	.....
3,458	.....	.....	.....	.....	.....	42	648	185	.....
7,250	.....	.....	.....	.....	.....	.....	52	45	.....
4,677	.....	.....	.....	.....	.....	.....	702	.....	.....
215,947	51,086	.....	175	1,961	.....	403	19,325	1,972	.....
94,360	106,905	.....	.....	832	.....	206	162,077	15,577	.....
210,405	165,260	.....	48	67	.....	850	31,046	5,361	.....
8,514	102	.....	.....	.....	.....	.....	17,790	2,468	.....
625,446	11,705	.....	.....	2,155	.....	1,692	56,890	8,332	.....
612,925	102	.....	.....	2,010	.....	5,203	65,727	3,418	537
1,872,542	3,753,468	2,057	22,935	1,043,318	21,589	131,253	491,205	136,926	2,396
441,390	54,391	211	.....	3,593	.....	2,819	100,779	4,014	320
273,615	86,990	533	43	39,453	.....	12,962	52,721	24,501	5,647
4,379,840	4,233,368	3,907	23,589	1,095,488	23,329	156,779	1,004,857	204,095	8,900

The year also marked another decline in shipments from western Kentucky fields into the Illinois coal market area. In spite of the increased use of coal in 1936 over 1935, shipments from western Kentucky declined from 1,809,479 tons in 1935 to 1,570,841 tons in 1936, a loss of 16.7 per cent.

Total shipments from the fields of origin, together with the percentage of change from 1935 are shown in table 8.

TABLE 8.—SUMMARY OF COAL SHIPMENTS, BY FIELDS OF ORIGIN, INTO THE ILLINOIS COAL MARKET AREA, 1935-36 [a]

(Tons of 2,000 pounds)

	1935 (Tons)	1936 (Tons)	Per cent change
Western Pennsylvania	52,774	58,928	+ 11.7
Central Pennsylvania, Somerset-Meyersdale, and Cumberland-Piedmont	78,900	84,463	+ 7.1
Fairmont (W. Va.)	20,041	50,419	+151.6
Northern and eastern Ohio	8,049	13,442	+ 67.0
Southern Ohio	6,324	12,826	+102.8
Kanawha (W. Va.), Logan and Kenova-Thacker (W. Va.-E. Ky.)	1,154,851	1,418,635	+ 22.9
New River-Winding Gulf and Pocahontas-Tug River	7,734,264	8,930,235	+ 15.5
Northeast Kentucky and McRoberts	1,296,589	1,605,173	+ 23.8
Virginia	180,282	176,530	− 2.1
Harlan and Hazard (E. Ky.)	2,882,506	4,066,926	+ 41.1
Northern Illinois	2,867,200	3,550,098	+ 23.8
Central and southern Illinois	19,448,170	22,379,558	+ 15.1
Indiana	4,985,220	5,292,262	+ 6.2
Western Kentucky	1,809,479	1,570,841	− 16.7
Total	112,524,649	49,210,336	+ 15.7

[a] U. S. Bureau of Mines, Monthly Coal Distribution Report No. 68.

Lake cargo coal.—Shipments of coal over the Great Lakes to Minnesota, Wisconsin, and Illinois ports reached an all-time high in the season of 1936. For comparative purposes, loadings in Lake Erie ports and cargo destinations to American ports since 1929 are given in table 9.

The substantial increase in 1936 over 1935 is partly the result of extremely cold weather in January and February of 1936 and the consequent decline of stocks to an abnormally low level. There was, in fact, an actual shortage of certain classes of coal.

Table 10 shows the quantity of stocks on Lake Michigan and Lake Superior docks, by months, for 1934, 1935, and 1936, and table 11 shows receipts at upper lake docks in these same years. The low point of stocks occurred in April 1936, after the severe winter weather in the preceding months and therefore the opening of the shipping season in 1936.

The effect of the unusually high lake shipments in 1936 are also shown in table 12, which shows the low and high points of stocks in the upper lake docks.

TABLE 9.—LAKE ERIE LOADINGS AND DESTINATION TO AMERICAN PORTS, 1929-36 [a]
(Thousands of net tons)

Year	Lake Erie loadings	Destination to American ports
1929	39,344	31,943
1932	25,173	20,014
1933	32,333	26,065
1934	35,971	28,399
1935	35,837	28,680
1936	45,441	37,185

[a] U. S. Bureau of Mines, Monthly Coal Distribution Report No. 69.

Stocks on hand reached an all-time high in November 1936. Weather conditions in 1936-37 were, however, less severe than in 1935-36, and in December 1936 stocks exceeded those of December 1935 by 836,000 tons. With this large supply of coal on hand, competition of lake dock coal with shipments from Illinois into the market areas of Wisconsin and Minnesota will be severe in 1937.

Origin of lake cargo coal.—The proportion of lake cargo coal coming from southern West Virginia and eastern Kentucky fields continues to increase. The change since 1923 is shown in table 13.

Increases have been particularly significant from the fields of low-volatile coals of southern West Virginia. Moreover, total shipments from the southern fields have risen from 36 per cent to 65 per cent of the total lake trade. Lake cargo shipments have been to a considerable degree responsible for the development of the coal industry in southern West Virginia and eastern Kentucky. These mining districts, unlike the districts of Pennsylvania and Ohio, do not have a large local outlet. Most of the coal output must move to distant markets or enter into competition in the Pittsburgh district with more favorably located Pennsylvania coal. The remote outlets are either eastward to tide water into the markets of New England and the Atlantic Seaboard, or westward to the Upper Mississippi Valley. Shipments from southern Appalachian fields to the Atlantic Seaboard have increased from 47 per cent of the total movement in 1923 to 63 per cent in 1936. The greatest increase has been from the fields of low-volatile

TABLE 10.—UPPER LAKE DOCK TRADE IN COAL, STOCKS AT END OF MONTH, 1934-36 [a]
(Thousands of net tons)

Month	Lake Superior docks	Lake Michigan docks	Total
1934			
January	3,271	1,986	5,258
February	2,635	1,508	4,193
March	2,006	1,062	3,068
April	1,409	736	2,144
May	2,135	1,228	3,363
June	3,454	1,544	4,998
July	4,525	2,057	6,582
August	5,307	2,488	7,795
September	5,666	2,775	8,441
October	5,887	3,042	8,929
November	5,800	3,224	9,024
December	4,958	2,780	7,738
1935			
January	3,960	2,261	6,221
February	3,338	1,857	5,196
March	2,805	1,504	4,309
April	2,472	1,418	3,890
May	3,376	1,576	4,952
June	4,387	1,967	6,356
July	5,034	2,238	7,272
August	5,456	2,507	7,963
September	5,600	2,708	8,308
October	5,189	2,723	7,912
November	5,234	2,994	8,228
December	4,370	2,534	6,904
1936			
January	3,332	1,958	5,290
February	1,979	1,204	3,183
March	1,421	871	2,291
April	1,022	636	1,659
May	2,174	1,092	3,266
June	3,313	1,566	4,879
July	4,562	1,928	6,490
August	5,428	2,302	7,729
September	5,840	2,631	8,471
October	5,931	2,900	8,831
November	5,991	3,202	9,193
December	5,018	2,722	7,740

[a] U. S. Bureau of Mines, Monthly Coal Distribution Reports.

TABLE 11.—UPPER LAKE DOCK TRADE IN COAL, RECEIPTS BY MONTHS, 1934-36 [a]
(Thousands of net tons)

Month	Lake Superior docks	Lake Michigan docks	Total
1934			
January	0	7	7
February	1	8	9
March	2	8	10
April	11	21	32
May	1,110	764	1,874
June	1,680	644	2,324
July	1,432	713	2,144
August	1,247	636	1,883
September	1,015	585	1,600
October	898	613	1,511
November	592	526	1,118
December	35	10	45
			12,557
1935			
January	0	3	3
February	0	7	7
March	0	6	6
April	168	219	387
May	1,302	482	1,783
June	1,375	640	2,015
July	1,019	513	1,532
August	926	524	1,451
September	750	521	1,272
October	464	453	917
November	817	670	1,488
December	0	6	6
			10,867
1936			
January	0	8	9
February	1	50	51
March	1	28	29
April	1	92	94
May	1,591	683	2,275
June	1,535	751	2,286
July	1,699	637	2,337
August	1,385	668	2,053
September	1,089	652	1,741
October	1,005	734	1,740
November	1,048	769	1,817
December	2	40	42
			14,474

[a] U. S. Bureau of Mines, Monthly Coal Distribution Reports.

coals. All-rail shipments from the southern Appalachian fields westward to the Illinois coal market area average about 47 per cent of the coal received by this market district and have not varied much since 1931, but the proportion received over the lakes has increased.

Distribution of Pennsylvania anthracite.—Shipments of anthracite into the Illinois coal market area were approximately one million tons in 1936. The distribution among the several states and important cities in this area, is given in table 14.

TABLE 12.—QUANTITY OF STOCKS HELD AT UPPER LAKE DOCKS IN APRIL AND NOVEMBER, 1934-36
(Thousands of net tons)

Month	1934	1935	1936
April	2,144	3,890	1,659
November	9,024	8,228	9,193
(Increase)	6,880	4,334	7,534

TABLE 13.—LAKE ERIE LOADINGS, 1934-36 (BY FIELDS OF ORIGIN) [a]
(Thousands of net tons)

Field	1923		1936	
	Net tons	Per cent	Net tons	Per cent
Ohio	6,417	20.9	2,908	6.4
Pittsburgh and other Pennsylvania	9,980	32.4	11,222	24.7
Mouldsville, Fairmont, Cumberland-Piedmont, Northern West Virginia	3,277	10.7	1,648	3.6
Southern West Virginia high-volatile	4,996	16.2	10,459	23.0
Southern West Virginia low-volatile	2,871	9.3	10,103	22.3
East Kentucky, Virginia and Tennessee	3,229	10.5	9,101	20.0
Total	30,768	100.0	45,441	100.0

[a] U. S. Bureau of Mines, Monthly Coal Distribution Reports.

TABLE 14.—SHIPMENTS OF ANTHRACITE INTO THE ILLINOIS COAL MARKET AREA, 1936 [a]
(Net tons)

To	By rail	By rail and tide	Total
Chicago, Illinois	235,076	52,232	287,308
Other Illinois cities	118,809	.....	118,809
Missouri	10,742	.....	10,742
Milwaukee, Wisconsin	35,841	179,211	215,052
Superior, Wisconsin	1,283	101,975	103,258
Other Wisconsin cities	144,125	.....	144,125
Iowa	32,151	.....	32,151
Duluth, Minnesota	.....	33,565	33,565
Minneapolis, Minnesota	147	16,070	16,217
St. Paul, Minnesota	.....	16,173	16,173
Other Minnesota cities	55,657	.....	55,657
North Dakota	13,885	.....	13,885
South Dakota	17,758	.....	17,758
Nebraska	6,876	.....	6,876
Total	672,350	399,226	1,071,576

[a] Monthly Reports of the Department of Mines, Commonwealth of Pennsylvania, 1936.

Competing fuels in the Illinois coal market area.—Aside from the competition of bituminous coal from the northern Pennsylvania and southern Appalachian fields discussed above, there is a considerable use of fuel oil, natural gas, coke, briquets, and anthracite.

Fuel oil.—Fuel oil consumed in the Illinois coal market area in 1934 and 1935 (the latest years for which detailed data are available) is shown in table 15.

TABLE 15.—FUEL OIL CONSUMED IN THE ILLINOIS COAL MARKET AREA, 1934-35 [a]
(Thousands of barrels of 42 gallons each)

State	1934	1935
Illinois	13,206	15,037
Indiana	6,199	6,935
Wisconsin	2,415	2,992
Minnesota	2,796	2,986
Iowa	1,032	1,378
Missouri	5,456	6,583
Total	31,104	35,911
Approximate coal equivalent (thousands of tons)	7,776	8,978

[a] U. S. Bureau of Mines, Mineral Market Reports.

The critical competition of fuel oil with coal is in the domestic heating field. From apparent consumption data, the use of fuel oil in industry has shown no increasing trends in the last decade, while the use of heating oils has risen from an estimated consumption of 4,100,000 barrels in 1926 to 25,282,000 barrels in 1936[1]. This is equivalent to a displacement of approximately 5,000,000 tons of coal in ten years.

Natural gas.—Tables 16 and 17 report the consumption of natural gas and importations into the Illinois coal market area in 1934 and 1935.

TABLE 16.—CONSUMPTION OF NATURAL GAS IN THE ILLINOIS COAL MARKET AREA, 1934-35 [a]
(Millions of cubic feet)

	Illinois	Iowa	Missouri	South Dakota	Nebraska
1934					
Domestic and commercial	19,628	3,501	12,109	1,505	3,459
Field	1,435	.....	12	.....	.....
Petroleum refineries	646	.....	3	.....	.....
Electric utility plants	358	3,249	2,668	473	2,262
Industrial, other	23,017	9,886	15,000	1,923	7,068
Total	45,084	16,636	29,792	3,901	12,789
1935					
Domestic and commercial	20,810	4,246	12,996	1,866	4,915
Field	1,414	.....	19	.....	.....
Petroleum refineries	168	.....	2	.....	.....
Electric utility plants	41	4,502	2,613	712	2,386
Industrial, other	34,886	10,329	17,430	2,078	7,009
Total	57,319	19,077	33,060	4,656	14,310

[a] U. S. Bureau of Mines, Mineral Market Reports.

1 Includes the states of Illinois, Indiana, Wisconsin, Minnesota, Iowa, and Missouri.

TABLE 17.—NATURAL GAS IMPORTED INTO THE ILLINOIS COAL MARKET AREA, 1934-35 [a]
(Millions of cubic feet)

From	1934	1935
To Illinois		
Kansas	2,019	2,107
Louisiana	10,971	13,574
Missouri	164	163
Texas	29,952	39,886
Kentucky	111	110
Indiana	3	34
Total	43,220	55,874
To Missouri		
Kansas	4,716	3,799
Louisiana	9,274	10,517
Oklahoma	2,880	6,342
Texas	12,597	12,024
Total	29,467	32,682
To Iowa		
Kansas	5,617	6,980
Texas	11,019	12,096
Oklahoma	.....	1
Total	16,636	19,077
To Nebraska		
Kansas	6,323	7,727
Oklahoma	181	455
Texas	5,473	5,453
Wyoming	812	675
Total	12,789	14,310
To Minnesota		
Kansas	3,621	6,025
Oklahoma	.....	2
Texas	3,504	4,552
Total	7,125	10,579
Grand Total	109,237	132,552

[a] U. S. Bureau of Mines, Mineral Market Reports.

PETROLEUM

Production and price.—The production of crude petroleum in Illinois in 1935 and 1936, by months, is given in table 18.

Petroleum production from these fields finds an outlet mainly in the refineries of the Illinois, Indiana, and western Ohio refining area. The trend of production in Michigan is of particular interest in view of the rapid rise in output of a district within an area of otherwise stable production. Production in the Michigan basin began in 1925 with an output of 4,000 barrels and rose to a peak of 15,776,000 barrels in 1935. The annual output since 1925 is as follows:

Year	Output (Thousands of barrels)
1925–1928	1,131
1929	4,528
1930	3,911
1931	3,789
1932	6,910
1933	7,942
1934	10,306
1935	15,776
1936	11,828

TABLE 18.—PETROLEUM PRODUCTION IN ILLINOIS, 1935-36 [a]
(Thousands of barrels)

Month	1935	1936
January	332	325
February	295	294
March	370	396
April	338	347
May	382	389
June	358	383
First 6 months	2075	2134
July	377	402
August	379	380
September	370	386
October	391	393
November	369	363
December	344	387
Year	4305	4445

[a] U. S. Bureau of Mines, Monthly Petroleum Statements.

Production in the Central West and Michigan fields in 1936 was as follows:

State	Output (thousands of barrels)	Price per bbl. at close of year
Illinois	4,445	$1.23
Indiana	798	1.23
Michigan	11,828	1.00–1.32
Northwestern Ohio	759	1.15

This rapid increase in output has affected adversely demand for oil from adjacent producing districts. In 1936 there was a sharp decrease of production in Michigan and the trend of future output is still problematical.

Distribution of petroleum products.—Illinois is an important center for the importation of crude petroleum and the distribution of refined products in the states of the Upper Missisippi Valley. It is exceeded by Indiana in quantity of crude oil runs to stills and to some extent its normal market area is also shared by refineries in Kentucky, Michigan, and Missouri. The relative importance of these states as refiners of oil is shown in table 19 giving the total quantity of crude oil run to stills in 1935.

TABLE 19.—CRUDE OIL RUN TO STILLS IN 1935 [a]
(Barrels of 42 gallons)

State	Barrels
Indiana	58,757,000
Illinois	35,469,000
Kentucky and Tennessee	7,203,000
Michigan	8,772,000
Missouri	6,006,000
Total	116,207,000
Percentage refined in Illinois—30.5	

[a] U. S. Bureau of Mines, Minerals Yearbook, 1936.

Crude oil run to stills in Illinois from outside sources is obtained principally from Oklahoma and Texas, in addition to small quantities from Indiana, Kansas, Kentucky, Louisiana, and New Mexico. Receipts by refineries in the Illinois-Indiana refining district is shown in table 20 as reported by the Bureau of Mines.

TABLE 20.—CRUDE OIL RECEIPTS AND CONSUMPTION AT REFINERIES, 1935 [a]
(Thousands of barrels)

Producing State	Receipts		
	Illinois	Indiana	Total
Illinois	3,536	.....	3,536
Indiana	.....	9	9
Oklahoma	23,054	31,196	54,250
Texas	3,077	7,784	10,861
Others	5,695	19,209	24,904
Total	35,362	58,198	93,560

[a] U. S. Bureau of Mines, Minerals Yearbook, 1936.

Manufacture of petroleum products.—Illinois is an important center for the manufacture and distribution of petroleum products. The principal refining district is located in the Chicago area with smaller refining centers near East St. Louis and at Lawrenceville and Robinson in the center of the large southeastern Illinois oil field. The refineries of Illinois are grouped with those of Indiana, western Ohio, Kentucky, and Michigan which together supply the market for refined oil products in the Central West. The approximate daily capacities of the refineries in this district, by states, are as follows:[2]

State	Crude oil capacity (In Barrels)
Illinois	137,300
Indiana	205,500
Kentucky	25,850
Michigan	49,500
Western Ohio	92,000
Total	510,150

Output of the three principal products of these refineries, by months, in 1936, together with stocks on hand at the end of the month, and indicated monthly consumption is shown in table 21. Of particular interest is the condition of stocks and trend of consumption in the gas, oil, and distillate fuel fraction and that of residual oils. The gas oil and fuel distillate fraction is the main source of heating oils used in a domestic oil burner, and the rapid increase in burner installation and in the use of heating oils is a significant characteristic of the oil market today. Consumption of oil for commercial and domestic heating since 1930 in the United States is as follows:[3]

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2 Oil and Gas Journal, vol. 35, No. 45, March 25, 1937.
3 U. S. Bureau of Mines, Monthly Market Reports.

Year	Thousands of barrels	Year	Thousands of barrels
1930	43,279	1934	60,822
1931	40,578	1935	76,853
1932	44,264	1936	99,257
1933	50,140		

In the market area served by the Illinois-Indiana-Kentucky refining district, consumption of heating oils amounted to 28,729,000 barrels in 1936 distributed as follows:

State	Thousands of barrels	State	Thousands of barrels
Illinois	11,505	Wisconsin	3,117
Indiana	1,487	Minnesota	3,439
Michigan	3,223	Iowa	1,207
Kentucky	224	Missouri	4,527
Total			28,729

The seasonal nature of the demand for this type of fuel and the growing demand are creating problems for the refining industry that may necessitate modification of refinery practice. Figure 1 shows the indicated monthly demand and stocks on hand of gas oil during 1936. Stocks fell unusually low in February and were the lowest for several years on account of the severe cold weather. Increased runs to stills and declining demand in the spring months resulted in the usual summer rise in stocks, although not too large to meet the anticipated demand for the heating season of 1936-37. With this item of demand apparently increasing each year, a new factor is making itself felt in the oil market. As long as heating oils were regarded as a by-product of the oil refining industry, and as long as a supply was always ample to meet the demand, the disposal of this fuel presented no particular problems. This condition is now changing. Heating oils are assuming the position of a cash crop to the oil industry and provisions must be made by the refining industry to supply this demand. The characteristics of this particular oil market are:

(1) A highly seasonal demand

(2) A market which depends mainly upon the gas oil and distillate fuel fraction for a suitable supply of fuel

(3) A rapidly increasing demand

(4) A price range which is above residual fuel oil, and below gasoline; it is governed to some extent by comparative retail prices of domestic coal

The seasonal nature of the demand for furnace oil reflects itself in a wide variation in stocks on hand between the low and high points of the year. As shown in figure 1, stocks fell to 907,000 barrels at the end of February, 1936 and rose to 3,165,000 at the end of October. In the meantime, the indicated consumption in February was 1,940,000 barrels, or nearly twice the quantity in

TABLE 21.—OUTPUT, STOCKS, AND INDICATED CONSUMPTION OF GASOLINE, GAS OIL REFINING

(Thousands

Month	Crude runs to stills	Natural gasoline	Gasoline			
			Output	Stocks	Changes in stock	Indicated consumption
January	10,932	357	6,091	10,235	+1061	5,030
February	10,496	307	5,884	11,559	+1324	4,560
March	11,588	336	6,368	12,115	+ 556	5,812
April	11,769	265	6,955	11,774	— 341	7,296
May	12,413	393	7,275	11,219	— 555	7,830
June	12,645	220	7,267	10,187	—1032	8,299
July	12,872	230	7,513	9,618	— 569	8,082
August	12,664	234	7,388	9,003	— 615	8,003
September	12,921	318	7,582	8,808	— 195	7,777
October	13,640	427	8,409	9,292	+ 284	8,125
November	12,549	398	7,369	9,417	+ 115	7,244
December	13,235	412	7,711	10,359	+ 942	6,769

[a] U. S. Bureau of Mines, Monthly Petroleum Statements.

AND FUEL DISTILLATE, AND RESIDUAL FUEL OIL IN THE ILLINOIS-INDIANA-KENTUCKY DISTRICT, 1936 [a]

of barrels)

Gas oil and distillate fuel				Residual fuel oil			
Output	Stocks	Changes in stock	Indicated consumption	Output	Stocks	Changes in stock	Indicated consumption
1,334	1,148	—568	1,902	1,707	1,679	—449	2,156
1,699	907	—241	1,940	1,719	1,474	—205	1,924
1,270	1,075	+168	1,102	1,735	1,670	+196	1,539
1,159	1,074	— 1	1,160	1,678	1,765	+ 95	1,583
1,355	1,548	+474	881	1,516	2,029	+264	1,252
1,249	2,100	+552	697	1,285	2,087	+ 58	1,227
1,198	2,650	+550	648	1,470	2,394	+307	1,163
1,317	3,052	+398	919	1,340	2,780	+386	954
1,315	3,202	+150	1,165	1,502	3,087	+307	1,195
1,449	3,165	— 37	1,486	2,055	3,192	+105	1,950
1,353	2,962	—203	1,556	1,900	3,012	—180	2,080
1,476	2,508	—454	1,930	2,191	2,941	— 71	2,262

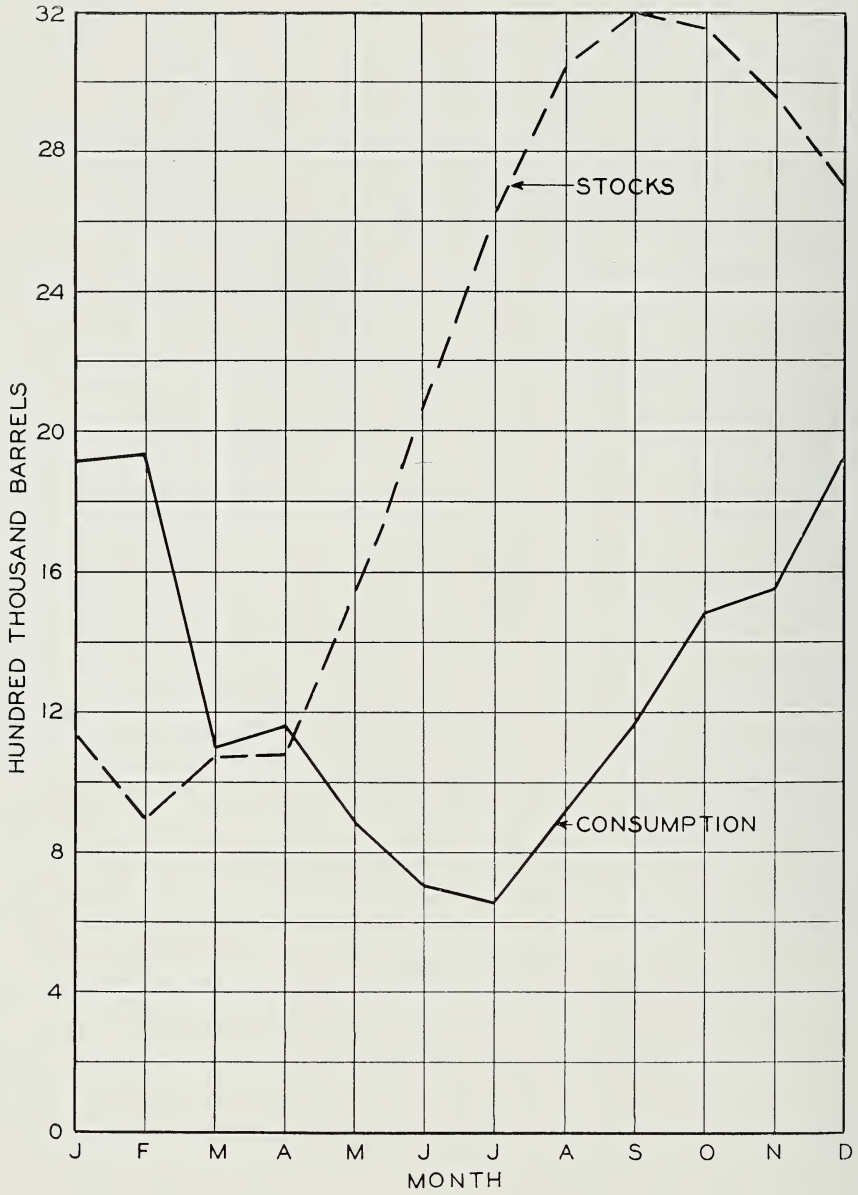

Figure 1.—Stocks and Indicated Consumption of Gas Oil and Distillate Fuel in 1936, in the Refining District of the Central West.

stocks and 240,000 barrels above production in that same month. Stocks fell to an unusually low level in February due to the severe weather conditions but the rapid accumulation after April 1 was not too excessive to take care of an increased demand in the heating season of 1936-37.

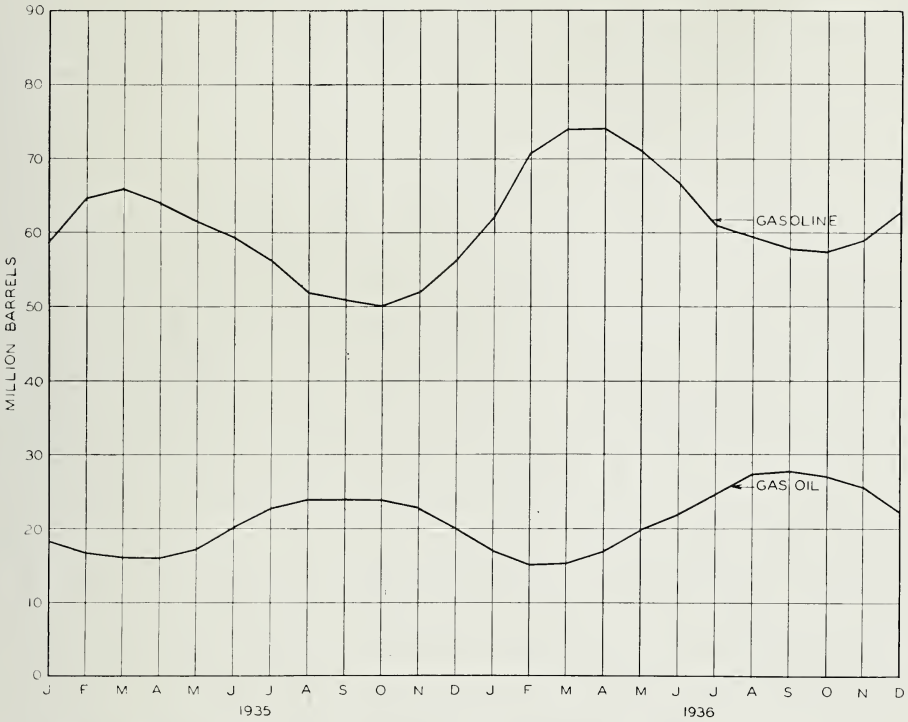

Figure 2.—Stocks of Gasoline, Gas Oil and Distillate Fuel in 1935 and 1936.

The consequences of this growing heating oil market upon stocks of both gasoline and heating oil are significant. Relationship between stock accumulations in these two commodities is shown in figure 2. With each annual increase in demand for heating oils. this condition will be accentuated. In order to insure an ample supply of heating, it is necessary to maintain a high run of stills and thereby increase gasoline stocks above the economic level. This condition was becoming apparent late in 1936 and its continuation in 1937 was indicated. In order to prevent this condition from becoming too pronounced, it may be necessary eventually to secure a better ratio between stocks and current demand by reducing the ratio of gasoline recovery in the early winter months and increasing the output of heating oils. Such a proposal is conditioned upon a continued high output of crude petroleum sufficient to yield adequate fractions of both gasoline and furnace oil.

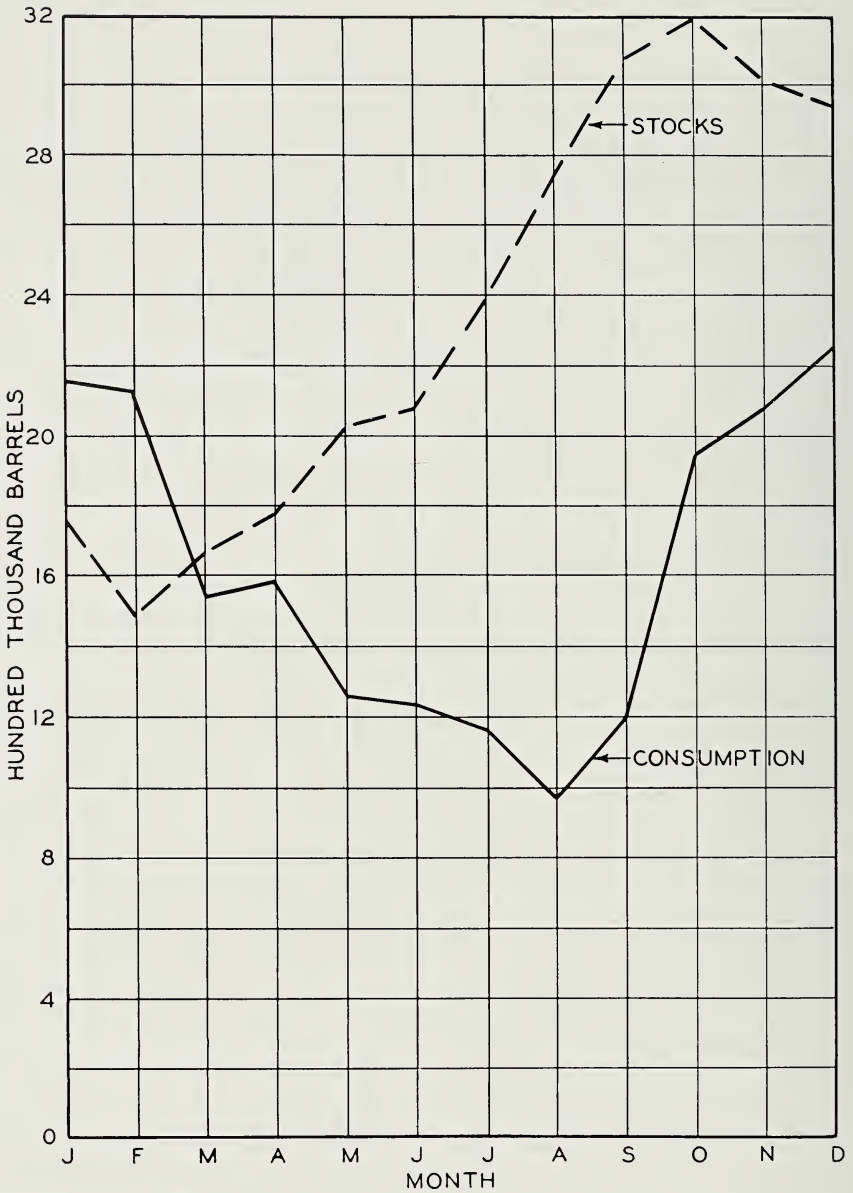

Figure 3.—Stocks and Indicated Consumption of Residual Fuel Oil in 1936, in the Refining District of the Central West.

Figure 3 shows the trend of consumption and stocks of residual fuel oil. While this trend follows somewhat that of the heating oils, the seasonal variation in demand and stocks is less pronounced.

The oil market.—Oil is marketed under three chief classifications: gasoline, fuel oil and heating oils, and range oil.

Gasoline.—The consumption of gasoline in six states in which the major portion of gasoline from the Illinois-Indiana refining district is marketed was 81,274,500 barrels in 1935, and increased approximately 8 per cent in 1936. Domestic demand in 1935 throughout the nation was 432,556,000 barrels, and in 1936 it was 467,000,000 barrels. These six states consume approximately 19 per cent of the total.

Fuel oil and heating oils.—Consumption of fuel oil, by uses, in 1935, the latest year for which detailed figures are available, is shown in table 22.

TABLE 22.—CONSUMPTION OF FUEL OIL, BY USES, IN THE ILLINOIS-INDIANA REFINING DISTRICT IN 1935 [a]
(Thousands of barrels of 42 gallons each)

Use	Illinois	Entire area[b]
Railroads	370	1,868
Steamships	146	667
Gas and electric plants	312	1,271
Smelter and refiners	46	103
Manufacturing industries	3,423	8,093
Heating oils	8,324	18,516
U. S. Navy, Army transports	19	187
Used as fuel by oil companies	2,197	4,852
Miscellaneous	200	354
Total	15,037	35,911

[a] U. S. Bureau of Mines, Mineral Market Reports.
[b] Comprising the states of Illinois, Indiana, Wisconsin, Minnesota, Iowa, and Missouri.

Range oil.—This type of oil, belonging to the kerosene group of distillates, is rapidly growing in use for cooking and hot water heating.

In the Illinois-Indiana refining area 593,000 barrels was consumed in 1934 and 1,505,000 barrels in 1936. While data for individual states are not separately reported previous to 1934, consumption throughout the nation has shown a rapid increase since 1930 as indicated in table 23.

TABLE 23.—CONSUMPTION OF RANGE OIL IN THE UNITED STATES, 1930-35 [a]
(Barrels of 42 gallons each)

Year	Barrels
1930	3,000,000
1931	4,549,000
1932	6,841,000
1933	10,269,000
1934	15,756,000
1935	21,526,000
1936	27,292,000

[a] U. S. Bureau of Mines, Mineral Market Reports.

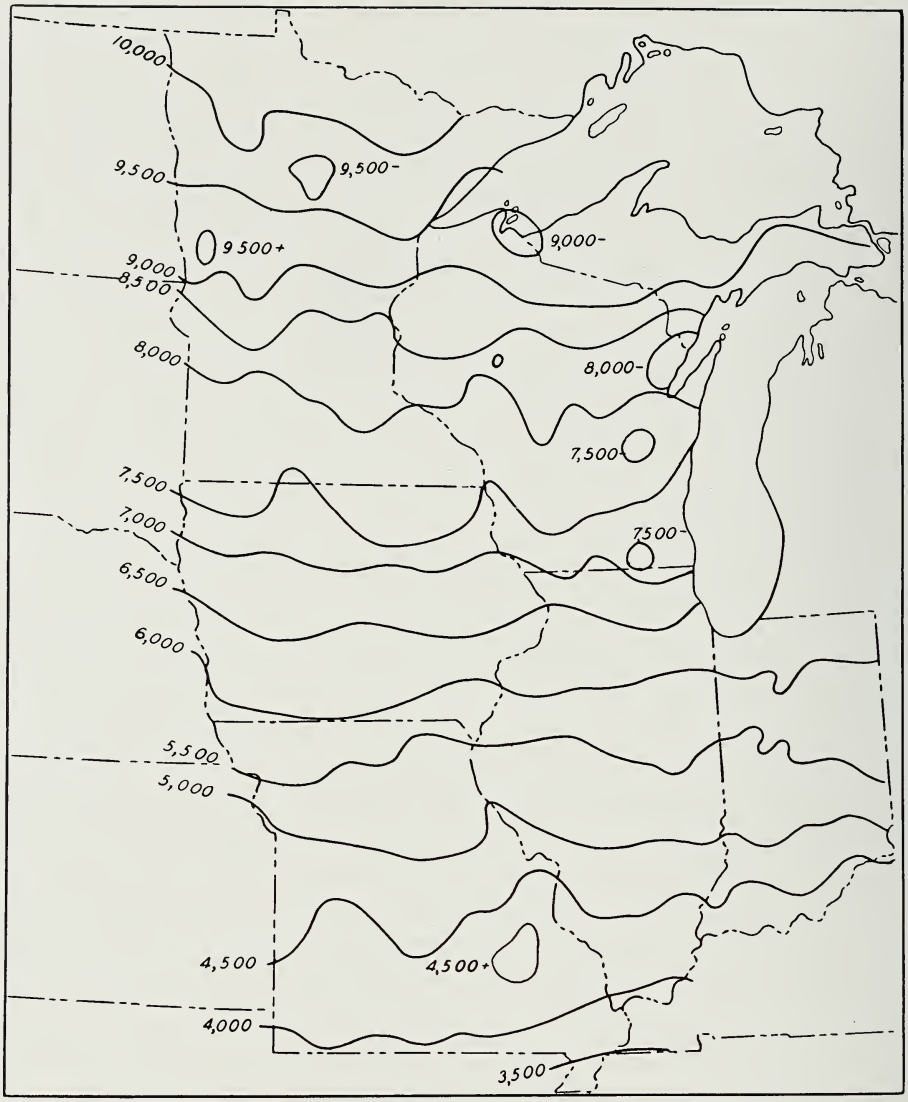

Figure 4.—A Degree-Day Map of the Illinois Coal Market Area.

This grade of oil has found especially wide use in the states of Massachusetts, Rhode Island, Connecticut, New York, and New Jersey which together consumed 15,202,000 millions barrels or 70 per cent of the national total, but is recently showing rapid growth in the Middle West also.

The trend in oil consumption appears to be in direction of greater diversity of products and an increase in those products adapted to special uses.

MEASUREMENT OF HEATING REQUIREMENTS

A degree-day map of the Illinois coal market area.—In figure 4 is presented a degree-day map of the Illinois coal market area. This map is useful in estimating the domestic fuel requirements per season of a particular city or area.

A degree-day is a day in which the average inside temperature is one degree higher than the average outside temperature. Heating requirements are almost directly proportional to degree-days and hence degree-days can be used in calculating fuel requirements. Degree-days are figured when the mean temperature falls below 65° F.

Degree-days for all official and cooperating U. S. Weather Bureau stations were calculated and plotted on the map shown in figure 4. Lines were then drawn through points of equal degree-day values at intervals of 500 degree-days each.

For example, in Springfield, Illinois, the number of degree-days during the heating season amounts to 5,300, whereas in International Falls, Minnesota, the number of degree-days reaches 10,200, or nearly twice that of Springfield. Fuel requirements for a house in this Minnesota community would be approximately twice that of a similar house in Springfield.

Seasonal distribution of heating requirements.—The relation between number of degree-days and fuel consumption, for Chicago, has been studied by the People's Gas, Light and Coke Company, and their findings for one season are shown in table 24.

TABLE 24.—COMPARISON OF ACTUAL CONSUMPTION IN PERCENTAGE TO NUMBER OF DEGREE-DAYS (ALSO IN PERCENTAGE) BY MONTHS FOR A HEATING SEASON, ON ONE INSTALLATION [a]

Month	Degree days in month	Percentage of season's total degree-days	Actual consumption in cu. ft.	Percentage of season's consumption
September	85	1.4	2,900	1.0
October	343	5.7	17,000	5.95
November	900	14.8	43,500	15.2
December	1059	17.4	49,000	17.1
January	891	14.7	44,100	15.4
February[b]	1144	18.8	54,200	18.9
March	878	14.4	40,900	14.3
April	558	9.2	25,800	9.0
May	200	3.3	8,600	3.0
June	20	.3	400	.15
	6078		286,400	

[a] Johnson, B. A., "House Heating Requirements," Jour. Western Soc. Engineers, Vol. XXXVIII, No. 6, December, 1933, p. 321.

[b] February was unusually cold during the season figured above.

TABLE 25.—AVERAGE DEGREE-DAYS FOR HEATING SEASON IN SELECTED ILLINOIS CITIES [a]

Month	Rockford (1887–1930)		Chicago (1870–1930)		Peoria (1865–1930)		Bloomington (1891–1930)		Springfield (1879–1930)		St. Louis (1873–1930)		Mt. Vernon (1895–1930)	
	Degree days	Per cent	Degree days	Per cent	Degree days	Per cent	Degree days	Per cent	Degree days	Per cent	Degree days	Per cent	Degree days	Per cent
September	30	0.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
October	403	6.0	341	5.5	372	6.5	310	5.4	279	5.2	186	4.2	217	4.7
November	840	12.5	750	12.0	780	13.6	720	12.8	690	13.0	570	12.9	570	12.4
December	1209	18.0	1116	17.8	1147	20.0	1116	19.8	1023	19.0	899	20.5	961	21.2
January	1395	20.7	1271	20.3	1116	19.5	1240	22.0	1178	21.8	1023	23.3	1023	22.4
February	1204	18.0	1092	17.5	1036	18.0	1036	18.4	980	18.2	840	19.0	878	19.1
March	930	13.9	899	14.4	775	13.5	775	13.6	744	13.9	620	14.0	620	13.6
April	510	7.6	540	8.6	420	7.3	390	7.0	360	6.7	270	6.1	300	6.6
May	186	2.6	248	3.9	93	1.6	62	1.1	62	1.2	.....	.....	.....	.....
June	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	6707		6257		5739		5599		5316		4408		4559	

[a] U. S. Weather Bureau, Climatic Summary of the United States, sections 56-58.

Average degree-days each month and their percentage distribution for selected Illinois cities is given in Table 25.

The differences in fuel requirements for house heating in the Illinois coal market area are indicated by number of degree-days for selected cities in the area as shown in table 26.

TABLE 26.—AVERAGE DEGREE-DAYS FOR SELECTED CITIES IN THE ILLINOIS COAL MARKET AREA

City	Years	Average degree-days	Index of relative fuel requirements Chicago=1.00
Duluth, Minn.	1870–1930	9530	1.51
Moorehead, Minn.	1880–1930	9432	1.51
St. Paul, Minn.	1870–1930	7981	1.27
Madison, Wis.	1868–1930	7346	1.17
Milwaukee, Wis.	1870–1930	7158	1.14
Sioux City, Iowa	1889–1930	6769	1.07
Des Moines, Iowa	1878–1930	6315	1.00
Chicago, Ill.	1870–1930	6257	1.00
Peoria, Ill.	1855–1930	5739	.92
Springfield, Ill.	1879–1930	5316	.85
St. Louis, Mo.	1873–1930	4408	.70
Cairo, Ill.	1872–1930	3873	.62

CLAY PRODUCTS

The clay products industry is one of the largest non-fuels mineral industries in Illinois, in terms of value of production. The total value of clay products produced in Illinois has increased each year since 1933, the total value for 1936 being $11,513,411. This is a 69 per cent increase over the 1935 total. The largest portion of this increase was in the structural and refractory division of the industry, as shown in table 27. The total value of pottery was higher in 1936 also, the figure as shown in table 27 being partly an estimated total.

TABLE 27.—VALUE OF CLAY PRODUCTS, 1933-36

Class	1933	1934	1935	1936
Structural and refractory clay products	$2,328,556	$4,498,960	$4,555,624	$ 8,625,364
Pottery	1,816,467	1,446,239	2,264,521	2,888,047[a]
Total	$4,145,033	$5,945,199	$6,820,145	$11,513,411

[a] Partly estimated.

Production of clay products, by classes.—In table 28 are shown the production—quantity, value, and quantity of stocks on hand at the end of the year—of each class of clay product produced in Illinois during 1936. Each of these classes increased in total quantity produced and in total value received during 1936 over the 1935 figures.

TABLE 28.—PRODUCTION OF CLAY PRODUCTS, BY CLASSES, 1936

	Quantity	Value	Quantity stocks on hand Dec. 31, 1936
Common brick (M)	206,967	$1,623,655	72,709
Face brick (M)	76,957	1,085,339	27,130
Hollow brick (M)	2,755	57,121	423
Hollow building tile (tons)	139,699	651,925	45,609
Vitrified brick or block			
for paving (M)	11,306	212,737	3,491
for other purposes (M)	1,092	16,815	1,746
Drain tile (tons)	50,641	335,748	14,830
Fireclay products	.....	962,091	.....
Refractory cement (clay) (tons)	645	20,131	49
Clay sold, raw or prepared (etc.)	.....	246,468	.....
Other clay products[a] (except Pottery)	.....	3,413,334	.....
Pottery	.....	2,888,047[b]	.....

[a] Terra-cotta, sewer pipe, flue lining, wall coping, and non-clay refractories included under "Other clay products, except Pottery".
[b] Partly estimated.

Final figures for production and value of each class of clay products during 1935 are given in Illinois Geological Survey Report of Investigations 43.

To illustrate the increases that occurred during 1936 in the structural clay products division of the industry, table 29 lists the four principal classes, common brick, face brick, hollow building tile, and drain tile, with the percentage increase in total quantity produced and total value received in each class over their respective 1935 totals. The largest increase of the four during 1936 was production and value of hollow building tile. The 1935 production of this class dropped in comparison to the total in 1934, while the other three classes continued to increase since the low year of production in 1933.

TABLE 29.—PERCENTAGE INCREASE OF CERTAIN CLASSES OF STRUCTURAL CLAY PRODUCTS DURING 1936 OVER THE TOTALS OF 1935.

Class	Percentage increase in	
	Quantity	Value
Common brick	110	109
Face brick	112	113
Hollow building tile	200	228
Drain tile	51	35

In table 30 are shown, by years from 1923 to 1936, insofar as data are available, the total production value of common brick, face brick, hollow building tile, drain tile, and pottery in Illinois. As shown in this table, the 1936 total production value of each of these classes of products is the largest in the past five or six years.

TABLE 30.—VALUE OF CERTAIN CLAY PRODUCTS PRODUCED IN ILLINOIS, 1923-36
(Dollars)

Year	Common Brick	Face Brick	Hollow Building Tile	Drain Tile	Pottery
1923	$12,034,948	.....	.....	$562,913	$4,691,676
1924	12,588,270	.....	.....	388,770	5,293,180
1925	13,532,425	.....	.....	707,859	5,423,000
1926	13,840,945	.....	.....	569,978	5,612,411
1927	12,843,713	.....	.....	817,027	5,028,257
1928	11,139,684	.....	.....	872,267	5,698,005
1929	7,805,051	.....	.....	987,579	5,964,041
1930	3,708,649	$2,301,076	$997,628	.....	4,174,459
1931	1,321,585	1,142,348	398,643	.....	3,612,210
1932	363,948	378,454	123,172	95,928	1,837,033
1933	280,284	104,640	73,672	124,722	1,816,467
1934	590,691	365,978	169,661	128,963	1,446,239
1935	778,087	479,119	198,120	249,589	2,264,521
1936	1,623,655	1,085,339	651,925	335,748	2,888,047[a]

[a] Partly estimated.

The size of the brick business in Illinois during the post-war years preceding and during the industrial depression is shown in table 30. It is not likely that the trend of building activity will, in the near future, reach the high level that it attained in those years following the war. However, it is significant that the southern soft wood regions are rapidly being depleted and that the West Coast remains as the only region with a surplus of lumber supply over local needs. It is suggested that although building activity may not be so great as in the past, the trend toward brick and brick veneer construction in present day building activities may require as many bricks in future building as in the past.

Production of certain types of clay products, by districts.—The production quantity, value, and stocks on hand of common brick, face brick, hollow building tile, and drain tile for 1936 are grouped by producing districts in table 31. Similar data for the year 1935 are given in Illinois Geological Survey Report of Investigations 43. The counties in each district are as follows:

District	Counties
Chicago	Lake, Cook, and Will
Northern Illinois	Bureau, Fulton, Knox, LaSalle, Livingston, and Tazewell
Central and Western Illinois	Henry, Macon, Menard, and Sangamon
East St. Louis	Madison and St. Clair
Other	Other

In table 31 those districts in which less than three producers reported are combined.

TABLE 31.—PRODUCTION OF CERTAIN TYPES OF CLAY PRODUCTS, BY DISTRICTS, 1936

District	Quantity (Thousands)	Value (Dollars)	Quantity Stocks on hand (Thousands)
Common Brick			
Chicago	127,320	$ 760,816	53,010
Northern Illinois	36,110	406,192	9,245
Central and Western Illinois	9,155	86,947	1,895
East St. Louis	15,861	153,393	3,665
Other	18,521	216,307	4,894
Total	206,967	$1,623,655	72,709
Face Brick			
Northern Illinois	28,005	$ 355,608	7,514
Central and Western Illinois	4,791	65,041	2,723
East St. Louis	19,398	274,080	8,430
Other	24,763	390,610	8,463
Total	76,957	$1,085,339	27,130
Hollow Building Tile	(Tons)		(Tons)
Northern Illinois	27,006	$ 154,995	13,553
Central and Western Illinois	16,985	74,635	2,360
East St. Louis	31,183	116,178	7,181
Chicago and Other	64,525	473,693	22,515
Total	139,699	$651,925	45,609
Drain Tile	(Tons)		(Tons)
Northern Illinois	19,248	$160,227	4,191
Central and Western Illinois	6,774	45,798	2,834
Other	24,619	129,723	7,805
Total	50,641	$335,748	14,830

Monthly shipments and stocks.—Shipments of common brick, face brick, and hollow building tile in Illinois during 1936, by months, are shown in table 32. These statistics are compiled by the U. S. Bureau of Census from reports of selected identical plants. Similar data for the year 1935 are given in

Illinois Geological Survey Report of Investigations No. 43, and similar tables for 1932, 1933, and 1934 in Report of Investigations 39. The yearly totals and monthly averages are shown in table 33 for comparison.

TABLE 32.—CLAY PRODUCTS, 1936 [a]

Month	Number plants	Shipments		Stocks on hand at end of month (Thousands)
		Thousands	Value	
Shipments of Common Brick in Illinois				
January	31	4,865	$ 47,861	59,614
February	31	3,023	29,508	57,421
March	32	10,556	105,567	50,711
April	33	12,616	126,681	42,373
May	38	17,229	164,442	44,056
June	37	18,099	175,258	60,083
July	38	17,502	164,470	62,991
August	38	19,457	183,875	54,552
September	38	19,882	191,702	54,574
October	39	21,212	202,914	63,831
November	39	18,402	177,289	71,185
December	40	18,990	175,656	74,472
Shipments of Face Brick in Illinois				
January	16	1,168	$ 17,584	25,236
February	16	549	9,196	28,121
March	16	4,161	68,869	27,653
April	16	6,894	113,119	26,618
May	18	9,282	157,020	24,023
June	18	9,537	161,445	23,925
July	18	8,586	149,733	23,158
August	18	7,847	137,279	23,595
September	18	6,615	112,151	24,270
October	18	6,828	116,030	24,592
November	17	4,765	81,175	25,344
December	16	3,714	62,638	24,355
Shipments of Hollow Building Tile in Illinois				
		(Tons)		(Tons)
January	15	1,077	$ 6,220	28,793
February	15	476	2,698	28,355
March	14	1,660	9,552	28,157
April	14	2,704	15,135	27,731
May	16	5,793	29,997	33,557
June	15	8,322	45,974	35,333
July	17	6,640	38,092	34,840
August	17	7,351	39,894	34,623
September	17	7,345	42,152	38,084
October	17	7,892	43,268	39,078
November	18	7,990	43,741	32,675
December	18	6,725	36,316	30,908

[a] Bureau of the Census, Monthly report on Structural Clay Products.

TABLE 33.—SHIPMENTS OF COMMON BRICK, FACE BRICK, AND HOLLOW BUILDING TILE IN ILLINOIS, 1932-36 [a]

Year	Shipments		Value		Average Value per Thousand	Stocks on hand at end of year (Thousands)
	Total (Thousands)	Average per month (Thousands)	Total (Dollars)	Average per month (Dollars)		
Common Brick						
1932.....	56,388	4,699	$446,906	$37,242	$7.93	69,771
1933.....	51,011	4,251	403,813	33,651	7.92	58,993
1934.....	62,269	5,189	564,164	47,014	9.06	55,120
1935.....	84,085	7,007	835,775	69,648	9.94	63,283
1936.....	181,833	15,153	1,745,223	145,435	9.60	74,472
Face Brick						
1932.....	32,439	2,703	$464,398	$38,700	$14.31	46,668
1933.....	22,825	1,902	305,168	25,432	13.81	26,863
1934.....	24,657	2,055	409,542	34,128	16.61	23,281
1935.....	36,923	3,077	596,248	49,687	18.85	24,411
1936.....	69,946	5,754	1,186,239	98,853	16.96	24,355
Hollow Building Tile						
	(Tons)	(Tons)			(Per ton)	(Tons)
1932.....	30,930	2,578	$ 104,922	$ 8,744	$ 3.39	45,282
1933.....	16,585	1,382	65,615	5,468	3.96	39,519
1934.....	31,580	2,632	163,312	13,609	5.17	34,766
1935.....	21,978	1,832	131,370	10,948	5.98	28,757
1936.....	63,975	5,331	353,039	29,420	5.52	32,678

[a] Data from the U. S. Bureau of the Census.

Total shipments and value increased markedly. The average value decreased for all three products according to this table. However, data on hollow building tile as reported to the U. S. Bureau of Census are from about 16 identical producing plants, while the total as reported to questionnaires sent out by the Illinois Geological Survey, as shown in table 27, was compiled from reports of 26 plants. Table 29 (which is compiled partially from figures given in table 27) shows that the production value of hollow building tile increased more than the production, which means an increase in unit price. This discrepancy in value per ton between the two sets of statistics is probably because those 16 plants reporting shipments to the U. S. Bureau of Census placed a lower unit value on hollow building tile during 1936 than they did in 1935, but the average unit price for the 26 plants reporting to the Illinois Geological Survey was somewhat higher in 1936 than in 1935. The same may be said for face brick.

Stocks on hand of common brick and hollow building tile at the end of 1936 were higher than at the end of 1935, while face brick stocks were slightly lower in those plants reporting to the U. S. Bureau of Census.

It is not the actual number or quantity of stocks on hand that plays an important part in the economic picture, but to the producer it is the relation

of the quantity of stocks to current demand which is important. For economy in operation, the individual producer must balance his inventory and production to satisfy the normal demand.

Table 34 shows the relation of stocks on hand at the end of each year to the demand for that current year in terms of months' supplies on hand December 31. These calculations are based on the figures given in table 33.

TABLE 34.—SUPPLY OF STOCKS ON HAND AT END OF YEAR, IN TERMS OF MONTHS, 1932-36
(Calculated from data given in table 33)

Year	Common Brick (Months)	Face Brick (Months)	Hollow Building Tile (Months)
1932	14.8	17.3	17.6
1933	13.9	14.1	28.6
1934	10.6	11.3	13.2
1935	9.0	7.9	15.7
1936	4.9	4.2	6.1

The purpose of table 34 is to show how increased demand during the past few years has enabled the producers to reduce their stocks into better balance. This table gives a general picture of the industry, but each producer should evaluate his own particular situation in regard to the amount of inventory he should carry. In analyzing table 34, the probable increase or decrease in demand for the ensuing months must be taken into account.

TABLE 35.—VALUE OF BUILDING PERMITS IN 16 ILLINOIS CITIES AND ST. LOUIS, MISSOURI, 1934-36 [a]

City	1934	1935	1936 (Preliminary)	Per cent increase
Aurora	282,282	250,270	557,779	122.87
Bloomington	238,046	579,122	300,615	−48.09
Chicago	7,727,351	12,936,409	19,007,332	46.94
Cicero	162,885	198,240	200,000[b]	0.89
Decatur	577,640	588,102	872,839	48.42
East St. Louis	265,498	869,123	392,083	−54.89
Elgin	169,946	217,945	499,401	121.14
Evanston	741,700	947,750	2,108,200	122.44
Freeport	99,887	229,090	272,252	18.84
Moline	170,653	335,893	619,238	84.36
Oak Park	181,850	626,200	1,491,575	138.19
Peoria	910,987	1,791,342	4,649,580	159.26
Quincy	58,314	95,065	224,820	136.49
Rockford	227,300	374,065	1,191,295	218.47
Rock Island	322,892	332,906	1,499,587	350.46
Springfield	326,184	456,453	2,887,557	532.61
St. Louis, Missouri	4,998,453	11,355,867	13,775,132	21.30
Total	$17,461,868	$32,183,842	$50,549,285	57.00

[a] Data from Commercial and Financial Chronicle, Jan. 23, 1937.
[b] Estimate.

Building permit data.—Since the clay products industry is more or less dependent upon the extent of building activity, a brief review of construction activities as revealed by building permit data is in order.

The first pronounced measure of building recovery was in 1935. The total value of building permits issued in the 17 cities listed in table 35 increased 84 per cent during 1935 in comparison to the 1934 total. As shown in table 35, the total value of building permits issued in these cities continued to increase in 1936, the total being 57 per cent above that of 1935.

TABLE 36.—F. W. DODGE CORP. FIGURES OF CONSTRUCTION CONTRACTS AWARDED IN 37 STATES EAST OF THE ROCKY MOUNTAINS [a]

(Thousands of dollars)

Type	1934	1935	1936	Per cent increase over 1935 (Calculated)
Commercial buildings	150,595.8	164,479.8	249,136.1	51.5
Factory buildings	116,078.6	108,858.5	198,019.1	82.4
Educational buildings	117,503.2	173,458.7	226,146.9	30.4
Hospitals and Institutions	37,308.8	47,056.9	74,120.1	57.5
Public buildings	55,672.0	97,786.6	102,208.2	4.5
Religious, etc., buildings	18,298.9	23,674.3	28,252.9	19.3
Social, etc., buildings	47,574.5	60,173.8	75,376.4	25.3
Non-residential buildings	543,031.8	675,488.6	953,259.7	41.1
Residential buildings	248,840.1	478,843.1	801,623.8	67.4
Total buildings	791,871.9	1,154,331.7	1,754,883.5	52.0
Public works, etc	625,044.5	578,541.8	714,142.7	23.4
Public utilities	126,192.0	111,671.4	206,269.8	84.7
Total construction	1,543,108.4	1,844,544.9	2,675,296.0	45.0

[a] Data from Commercial and Financial Chronicle, Jan. 23, 1937.

The value of permits issued increased in 15 of the 17 cities during 1936, with Bloomington and East St. Louis showing decreases. These two cities had increases of 143 per cent and 130 per cent, respectively, in 1935 over 1934. More than one half of these 17 cities had increases in value of 1936 building permits of more than 100 per cent as compared to 1935.

Building construction in Illinois appears to be increasing at approximately the same rate as it is in other parts of the country. In table 36 are presented data compiled by the F. W. Dodge Corp. showing construction contracts awarded during the past three years in 37 states east of the Rocky Mountains.

This table shows that contracts awarded for non-residential building in these states during 1936 amounted to about 150 million dollars more than that for residential building. However, the 1936 total residential awards increased 67 per cent over the 1935 total, while non-residential increased but 41 per cent. The greatest increase for the latter class of construction was for factory buildings, hospitals and institutions, and commercial buildings. Public utilities increased 85 per cent over the 1935 total in this class. Public works contracts awarded showed a 23 per cent increase.

Although these statistics, as compiled by the F. W. Dodge Corp., apply to 37 states east of the Rocky Mountains, the trends in types of construction contracts awarded in Illinois are essentially the same.

The volume of home building in this State should increase for the next few years as in other sections of the country due to depreciation, obsolescence, increased population, and severe contraction of building during the depression years.

TABLE 37.—VALUE OF BUILDING PERMITS OF SIX GROUPS OF ILLINOIS CITIES FROM 1920-36 [a]
(Millions of dollars)

Year	Chicago, Oak Park, Evanston, Cicero	St. Louis and East St. Louis	Rock Island and Moline	Rockford and Freeport	Elgin and Aurora	Springfield, Decatur, Bloomington, Peoria
1920	79.5	19.6	.....	.....	.....	9.3
1921	135.6	18.0	.....	.....	.....	8.1
1922	243.7	27.9	.....	.....	.....	11.2
1923	351.3	44.3	2.1	4.8	4.7	10.1
1924	316.9	43.1	2.2	4.9	4.4	15.3
1925	382.9	60.1	2.3	7.4	7.2	17.9
1926	386.9	44.3	2.6	6.5	7.7	16.4
1927	378.0	47.7	3.4	8.2	4.7	14.0
1928	338.3	45.5	2.8	7.7	5.7	13.2
1929	216.2	29.8	4.4	6.2	3.7	11.9
1930	84.6	18.8	2.1	3.5	2.2	9.3
1931	48.5	17.7	1.2	.9	1.8	5.4
1932	4.8	4.6	.3	.9	.3	1.5
1933	4.3	10.3	.3	.2	.2	2.8
1934	8.8	5.3	.5	.3	.5	2.1
1935	14.7	12.2	.7	.6	.5	3.4
1936	22.8	14.2	2.1	1.5	1.1	8.7

[a] Data from Commercial and Financial Chronicle, Jan. 23, 1937.

Table 37 presents building permit data for six groups of Illinois cities (including St. Louis, Missouri), in millons of dollars, for the years 1920 to 1936. The remarkable return of building construction during the past two years is shown. Also pictured by this table are the great strides construction must take before it can be said that normal building conditions are restored. While it is improbable that the activity in building in the period 1926-1928 will occur in the future, the level of building activity in 1936 is probably much below normal requirements.

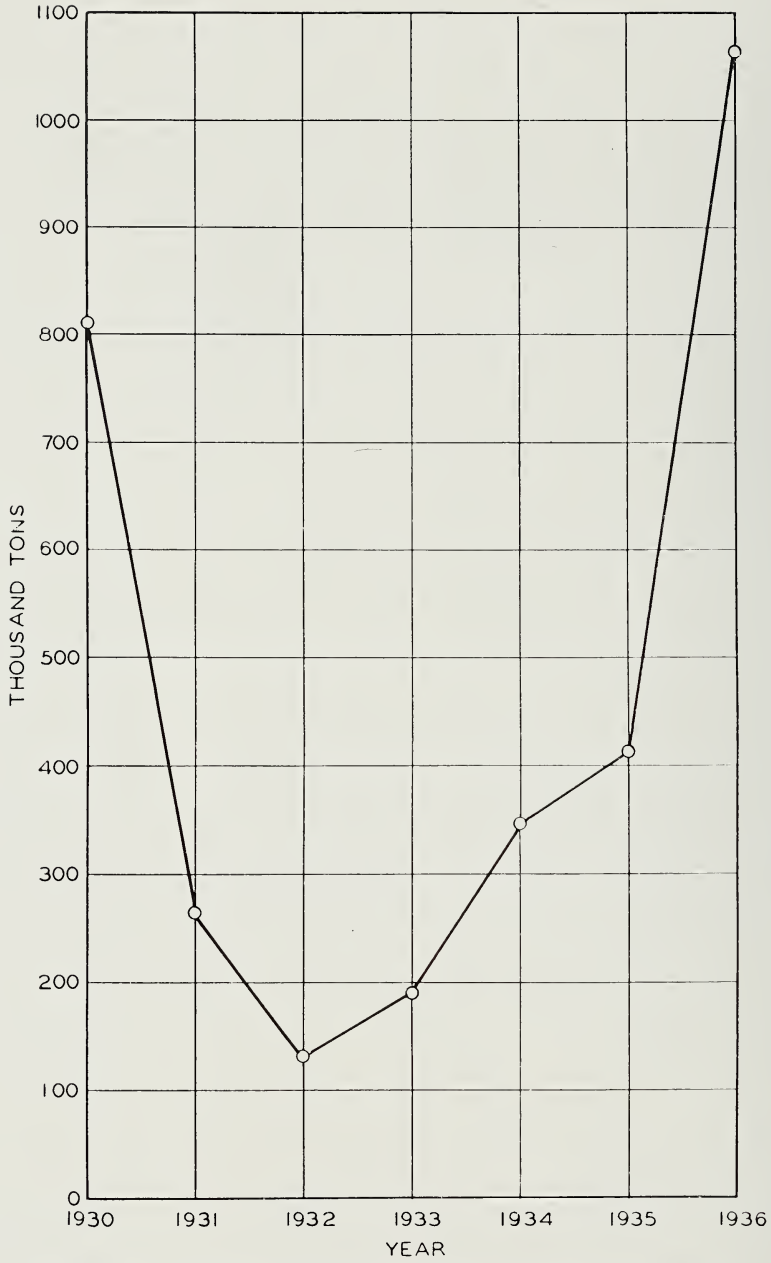

Figure 5.—Consumption of Agricultural Limestone in Illinois, 1930-1936.

The total value of building permits, the number of permits issued, and the average value per permit for 16 Illinois cities are given, by months, for 1936 in table 38.

These figures are calculated from reports given in the monthly issue of the Illinois Journal of Commerce. This table shows that the total value of permits issued in these 16 cities was higher each month during 1936 as compared to the corresponding month of 1935. There were more permits issued each month in 1936, except during February, but the average value per permit was smaller during some months.

TABLE 38.—VALUE OF BUILDING PERMITS IN 16 ILLINOIS CITIES[a], BY MONTHS, 1935-36

Month	1935			1936		
	Value of building permits	Number of permits	Average value of permit	Value of building permits	Number of permits	Average value of permit
January	$ 94,963	151	$ 628.8	$809,143	203	$3,985.9
February	165,307	222	744.6	214,525	141	1,230.6
March	704,078	379	1,857.7	974,588	632	1,542.0
April	790,493	601	1,315.2	3,510,586	752	4,668.0
May	362,406	610	594.1	1,516,786	982	1,545.1
June	686,543	629	1,091.5	1,027,920	1,077	954.4
July	526,791	646	815.5	1,058,057	828	1,277.5
August	499,388	684	730.1	1,076,839	894	1,204.5
September	806,575	713	1,131.2	1,299,126	1,078	1,205.1
October	637,374	782	815.1	1,278,933	1,068	1,197.5
November	819,422	521	1,572.8	1,086,265	744	1,433.1
December	1,124,542	307	3,663.0	1,752,578	562	3,118.2

[a] Figures for the 16 cities: Aurora, Bloomington, Champaign, Danville, Decatur, East St. Louis, Elgin, Freeport, Joliet, Moline, Peoria, Quincy, Rockford, Rock Island, Springfield, Waukegan.

AGRICULTURAL LIMESTONE

Final returns from producers of agricultural limestone in Illinois and adjoining states show that Illinois farmers applied approximately 1,069,766 tons to the soil in 1936. This total represents 116 per cent increase over the 1935 total. The following figures show the steady increase in consumption of limestone by the farmers in this State since the low year of 1932. The total for 1936 is above that of all previous records. Consumption from 1930 to 1936 is shown in table 39 and figure 5.

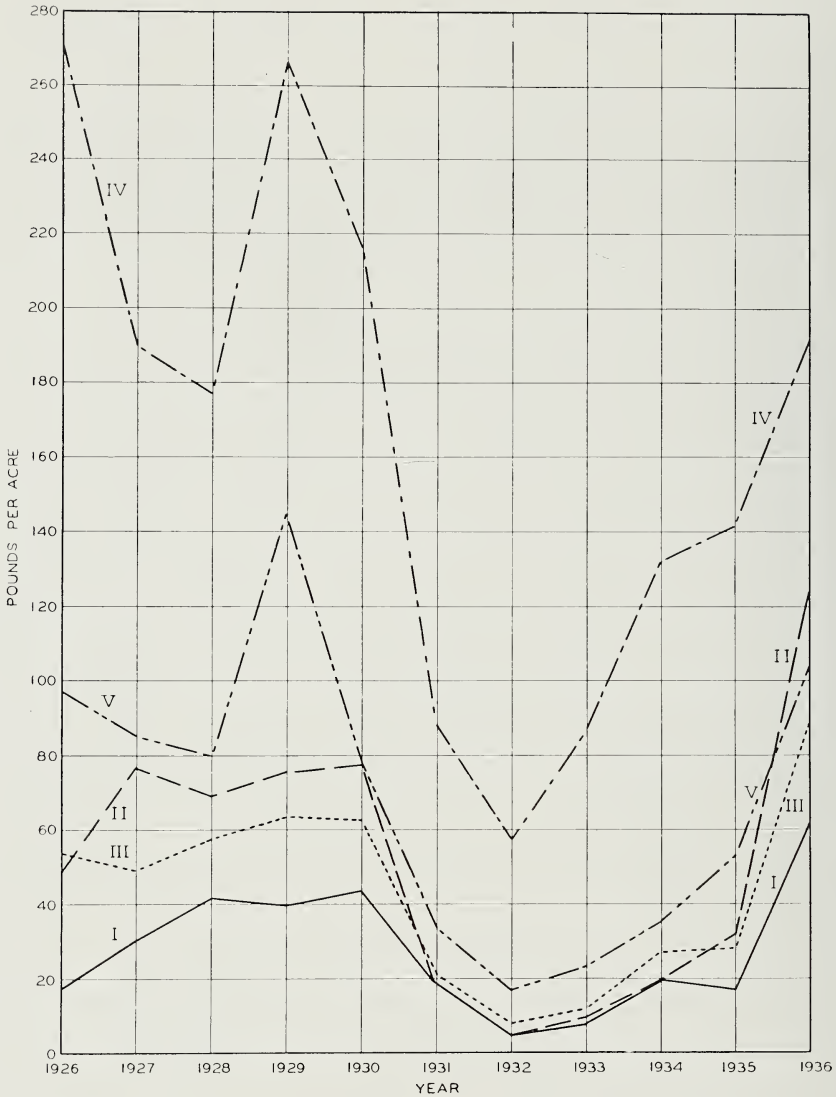

Figure 6.—Consumption of Agricultural Limestone, in Pounds per Acre, by Districts (see fig. 9).

Federal aid given to the farmers for the purchase of limestone during 1936 has helped increase this total tonnage to such a high figure. Experiments throughout the State by the Illinois Agricultural Experiment Station have proved that the application of limestone to Illinois soils is one of the soundest investments a farmer can make. The quality and quantity of crops which succeed the appli-

cation of limestone to the soil not only pays for the limestone itself over one or more years, but also proves additional returns, the amount depending upon the need of the particular soil and the method of limestone application. Many farmers no doubt applied limestone on their crop lands for the first time last year as a result of the Federal aid. New markets for agricultural limestone producers should thus be created.

The sale of agricultural limestone has become more than a by-product business for many of the producers, and for many plants it represents a definite and major sales outlet for their product. This was realized by many during the depression years when the agricultural limestone market, although decreasing, continued at a fairly stable level as compared to outlets in the building and associated markets which were severely depressed. Table 39 shows clearly the revival of this market.

TABLE 39.—AGRICULTURAL LIMESTONE CONSUMED IN ILLINOIS, 1930-36

Year	Tons	Year	Tons
1930	811,000	1934	346,141
1931	266,886	1935	415,214
1932	132,995	1936	1,069,766
1933	190,963		

Agricultural limestone offers a recurring business. The expansion of the present market will depend upon informing the farmer of the profitableness of applying limestone to the soil. There are certain large areas in this State where the consumption is yet far below the needs of the soil, due to the annual removal of carbonates by erosion, leaching, and by the crops themselves.

Detailed statistics were received from Illinois producers and from producers in Indiana, Kentucky, Missouri, Iowa, and Wisconsin who ship agricultural limestone into Illinois. Information was also received from certain farm advisers in Illinois, supplying data for the many small local producers in these counties whose production figures were not available.

Table 40 lists final figures for the tonnage of agricultural limestone marketed in each county during 1935 and 1936. It has been necessary to estimate the consumption for certain counties, the figures for each representing a comparison of data received from both producers and farm advisers.

The approximate number of pounds of agricultural limestone used per acre of arable land in each county during the past three years is given in table 41. Figure 6 shows the average consumption of limestone on crop lands, in pounds per acre, by districts, for 1926-36. The counties in this table and chart are grouped as defined on the index map (fig. 9, p. 63).

TABLE 40.—TONNAGE OF AGRICULTURAL LIMESTONE USED IN ILLINOIS, BY COUNTIES, DURING 1935 AND 1936

County	1935 Total	1936		
		Produced in Illinois	Produced in other states	Total
Adams	5,139	6,855	811	7,666
Alexander	55	282	20	302
Bond	6,280	7,661	239	7,900
Boone[a]	0	6,000	.....	6,000
Brown[a]	432	1,000	.....	1,000
Bureau[a]	3,000	11,738	460	12,198
Calhoun	0	1,593	.....	1,593
Carroll[a]	128	19,000	.....	19,000
Cass	663	2,071	100	2,171
Champaign	3,041	17,101	.....	17,101
Christian	3,641	11,031	.....	11,031
Clark	15,341	18,327	10,471	28,798
Clay	469	2,162	55	2,217
Clinton	16,532	27,625	.....	27,625
Coles	910	6,329	696	7,025
Cook	2,683	7,549	41	7,590
Crawford	1,378	6,252	1,992	8,244
Cumberland	3,772	8,237	10,804	19,041
DeKalb[a]	435	8,000	.....	8,000
DeWitt	1,540	8,706	60	8,766
Douglas	2,950	6,611	1,295	7,906
DuPage	1,153	1,736	.....	1,736
Edgar	3,850	562	2,145	2,707
Edwards	1,306	10,381	355	10,736
Effingham	9,923	14,098	7,893	21,991
Fayette	3,995	9,560	474	10,034
Ford	2,242	10,729	.....	10,729
Franklin	3,364	4,024	.....	4,024
Fulton	1,617	5,228	925	6,153
Gallatin[a]	0	9,950	50	10,000
Greene	8,739	14,897	.....	14,897
Grundy	904	2,138	.....	2,138
Hamilton	1,859	2,045	.....	2,045
Hancock	952	5,562	1,312	6,874
Hardin	0	548	.....	548
Henderson	115	4,300	.....	4,300
Henry	8,575	14,222	10,037	24,259
Iroquois	4,213	13,864	9,649	23,513
Jackson	6,001	6,885	.....	6,885
Jasper	2,451	7,236	.....	7,236
Jefferson	3,158	7,884	.....	7,884
Jersey	5,884	6,789	.....	6,789
JoDaviess[a]	8,000	9,500	500	10,000
Johnson	1,680	2,711	.....	2,711
Kane	1,875	3,609	.....	3,609
Kankakee	344	14,807	.....	14,807
Kendall	1,214	6,002	.....	6,002
Knox	3,845	3,759	9,123	12,882
Lake	1,296	1,269	.....	1,269
LaSalle	664	12,805	.....	12,805
Lawrence	2,235	2,163	1,616	3,779
Lee[a]	148	20,700	52	20,752
Livingston	7,141	32,616	.....	32,616

[a] Estimated.

TABLE 40.—(Concluded)

County	1935 Total	1936		
		Produced in Illinois	Produced in other states	Total
Logan	1,956	13,211	.....	13,211
McDonough	324	2,498	1,560	4,058
McHenry	2,104	4,071	103	4,174
McLean	19,852	47,595	.....	47,595
Macon	2,580	14,391	333	14,724
Macoupin	16,012	12,991	.....	12,991
Madison	17,396	30,577	.....	30,577
Marion	7,583	7,706	.....	7,706
Marshall	2,813	5,809	98	5,907
Mason	2,046	10,720	.....	10,720
Massac	53	934	.....	934
Menard	765	5,745	.....	5,745
Mercer	3,856	2,442	8,030	10,472
Monroe	9,592	11,831	.....	11,831
Montgomery	5,365	11,216	.....	11,216
Morgan	2,411	2,830	.....	2,830
Moultrie	392	2,868	452	3,320
Ogle[a]	4,000	4,000	.....	4,000
Peoria	4,785	15,248	578	15,826
Perry	10,200	9,561	.....	9,561
Piatt	1,962	6,573	96	6,669
Pike[a]	20,000	20,000	233	20,233
Pope	116	7,741	.....	7,741
Pulaski	64	820	.....	820
Putnam	210	2,735	.....	2,735
Randolph	15,402	24,148	39	24,187
Richland	1,809	3,643	2,274	5,917
Rock Island	6,407	6,954	4,753	11,707
St. Clair	27,076	55,823	.....	55,823
Saline	1,003	5,319	.....	5,319
Sangamon	2,589	9,230	.....	2,900
Schuyler	513	2,600	43	2,643
Scott	226	2,200	.....	2,200
Shelby	3,431	13,110	2,457	15,567
Stark	1,404	1,924	1,869	3,793
Stephenson[a]	198	18,000	.....	18,000
Tazewell	3,113	10,143	.....	10,143
Union	3,562	3,596	1,093	4,689
Vermilion	2,357	7,476	698	8,174
Wabash	1,527	565	3,958	4,614
Warren	419	7,366	61	7,427
Washington	21,090	11,550	405	11,955
Wayne	690	2,218	589	2,807
White	1,438	1,192	6,969	8,161
Whiteside	2,184	5,475	321	5,796
Will	1,298	11,843	.....	11,873
Williamson	1,958	2,491	.....	2,491
Winnebago[a]	14	30,000	.....	30,000
Woodford	4,637	19,263	.....	19,263
Trucked (County unknown)	7,782	4,507	.....	4,507
Total	415,214	961,579	108,187	1,069,766

[a] Estimated.

TABLE 41.—CONSUMPTION OF LIMESTONE ON CROP LAND, BY COUNTIES, 1934-36
(Pounds per acre)

County	Farm land in crops (1929)	Pounds of Limestone per Acre			
		1934	1935	1936	1926–1930 average
Group 1					
Cook	164,478	32	33	92	28
DuPage	102,525	11	22	34	37
Ford	251,129	29	18	85	45
Grundy	197,112	20	9	22	31
Iroquois	557,286	20	15	84	34
Kane	211,385	18	18	34	35
Kankakee	302,664	3	2	98	30
Kendall	154,130	35	16	78	43
Lake	105,632	24	25	24	19
Livingston	546,648	17	26	119	47
McHenry	222,210	11	19	38	25
Will	348,255	23	7	68	25
Average for data available		20.2	17.5	64.6	33.3
Group 2					
Boone	119,416	18	(a)	100	90
Bureau	364,803	9	16	67	41
Carroll	160,827	(a)	(a)	236	68
DeKalb	306,290	7	3	52	55
Henry	352,861	50	50	137	85
JoDaviess	156,735	(a)	102	128	48
LaSalle	518,450	9	3	49	35
Lee	324,847	4	1	128	74
Mercer	202,377	30	38	104	61
Ogle	312,720	(a)	26	26	48
Rock Island	133,975	5	96	175	118
Stephenson	216,596	8	2	166	52
Whiteside	295,856	15	15	39	101
Winnebago	189,201	5	(a)	317	180
Average for data available		14.5	32.	123.1	75.4

[a] Data incomplete.

TABLE 41.—(Continued)

County	Farm land in crops (1929)	Pounds of Limestone per Acre			
		1934	1935	1936	1926–1930 average
Group 3					
Adams	277,310	55	37	55	59
Brown	80,291	23	11	24	108
Cass	146,012	8	9	30	91
Champaign	514,120	20	12	67	49
Christian	319,031	19	23	69	46
Clark	145,009	160	212	397	178
Coles	209,790	14	9	67	43
Cumberland	108,915	58	69	350	50
DeWitt	188,278	18	16	93	50
Douglas	205,598	21	24	77	49
Edgar	269,689	26	29	20	29
Fulton	300,163	20	11	41	27
Hancock	283,251	15	7	49	51
Henderson	191,106	[a]	1	45	49
Knox	274,189	35	31	94	46
Logan	304,439	11	13	87	36
Macon	272,508	25	17	108	33
Marshall	160,608	12	35	74	55
Mason	228,930	29	18	94	86
McDonough	230,365	23	3	35	50
McLean	587,468	108	68	162	75
Menard	141,309	9	11	81	39
Morgan	221,958	29	22	26	64
Moultrie	163,885	6	5	41	25
Peoria	216,423	52	44	146	75
Piatt	217,725	31	18	61	35
Pike	251,943	[a]	159	161	125
Putnam	59,772	2	7	92	78
Sangamon	368,786	22	14	50	45
Scott	91,619	6	3	48	116
Schuyler	138,184	3	7	38	36
Shelby	291,314	10	23	107	44
Stark	127,343	21	22	60	47
Tazewell	287,997	27	22	70	66
Vermilion	412,415	12	11	40	45
Warren	224,789	2	4	66	29
Woodford	238,169	46	39	162	93
Average for data available		27.9	28.8	88.8	60.0
Group 4					
Calhoun	71,970	[a]	[a]	44	52
Greene	181,258	122	91	164	151
Jersey	114,569	93	113	119	198
Macoupin	272,761	116	132	95	98
Madison	267,696	115	130	228	206
Monroe	128,509	257	149	184	419
Randolph	196,678	168	157	246	250
St. Clair	245,327	52	220	455	286
Average for data available		131.8	141.7	190.6	209.9

[a] Data incomplete.

TABLE 41.—(Concluded)

County	Farm land in crops (1929)	Pounds of Limestone per Acre			
		1934	1935	1936	1926-1930 average
Group 5					
Alexander	49,556	[a]	2	12	232
Bond	126,912	20	99	124	212
Clay	163,655	1	6	27	70
Clinton	188,070	84	176	294	238
Crawford	118,315	13	23	139	145
Edwards	84,133	33	31	255	83
Effingham	164,133	51	121	268	146
Fayette	237,164	9	34	85	71
Franklin	109,587	47	61	73	95
Gallatin	98,154	3	[a]	204	47
Hamilton	154,223	15	24	27	31
Hardin	30,345	80	[a]	36	15
Jackson	164,628	66	73	84	130
Jasper	170,030	7	39	85	36
Jefferson	168,303	16	38	100	68
Johnson	73,623	40	46	74	36
Lawrence	111,798	27	40	68	57
Marion	187,582	27	81	82	82
Massac	63,905	[a]	1	29	68
Montgomery	255,255	25	42	88	103
Perry	132,068	64	155	145	123
Pope	69,469	36	[a]	117	23
Pulaski	59,876	3	2	27	67
Richland	128,237	6	28	92	61
Saline	115,918	107	18	92	43
Union	105,293	59	68	99	121
Wabash	91,773	32	33	101	71
Washington	214,242	110	197	112	196
Wayne	236,695	4	6	24	20
White	182,452	22	16	89	75
Williamson	111,266	34	35	45	64
Average for data available		35.9	53.4	99.9	91.2

[a] Data incomplete.

Total shipments of agricultural limestone into Illinois from neighboring states in 1936 were almost double the total imports in 1935. However, the percentage imports of the total consumption by Illinois farmers was less than in 1935. Total imports and the percentage of the total consumption for the years 1931 to 1936 are shown in table 42.

Agricultural limestone produced in Illinois is also marketed in about seven near-by states. These shipments are shown, by state of destination, for the years 1931 to 1936 in table 43. A steady increase in shipments out of the State since the low year of 1932 may be noted. Increased shipments were especially significant during 1936 to Kentucky, Indiana, and Tennessee.

TABLE 42.—AGRICULTURAL LIMESTONE PRODUCED IN OTHER STATES AND MARKETED IN ILLINOIS, 1931-36
(Tons)

Year	Tons consumed from outside producers	Per cent of total consumption
1931	31,160	11.6
1932	15,231	11.5
1933	12,845	6.7
1934	56,095	16.2
1935	54,803	13.2
1936	108,187	10.1

TABLE 43.—AGRICULTURAL LIMESTONE PRODUCED IN ILLINOIS AND MARKETED IN OTHER STATES, 1931-36
(Tons)

Year	Wis.	Ia.	Mo.	Ky.	Ind.	Mich.	Tenn.	Total
1931	650	.....	37	500	9,570	4,764	1,450	16,971
1932	.....	.....	263	.....	3,311	850	683	5,107
1933	.....	62	80	41	5,299	421	730	6,633
1934	85	65	2,232	.....	9,093	1,546	238	13,259
1935	67	1	130	32	10,102	4,135	1,095	15,562
1936	56	40	587	4,129	30,341	5,174	6,020	44,398

MINERAL WOOL

Production of mineral wool in Illinois in 1936 reached a value of approximately $190,000. This is the first year in which the output of this mineral product is separately reported. In 1936, four plants were in operation, one of which began operations during the year. Sustained activity in building has created a demand for mineral wool and the demand is expected to increase in 1937.

Production in 1935 in the United States is reported at $5,571,000 and is expected to show substantial increases in 1936. On the basis of 1935 production, the output in Illinois was about one-thirtieth of the national output. The market area available to Illinois producers, principally in the states of Illinois, Wisconsin, Minnesota, Iowa, and Missouri, has a population of 20,000,000 or nearly one-sixth of the United States. There is, therefore, a large potential market to be supplied and further expansion of output and plant capacity can safely be made.

Only about 12 tons of mineral wool can be loaded into a box car and as a result freight rates are high. The industry will therefore be decentralized. The erection of a plant should be preceded by careful market surveys to determine the probable demand within an economic freight rate area.

FLUORSPAR [4]

Production.—In 1936 fluorspar was known to have been produced at 100 mines and prospects and, in addition, small quantities were recovered at an undetermined number of prospects and reclaimed from mill ponds, waste dumps, and old workings of abandoned mines. All operations yielded about 168,000 short tons of merchantable fluorspar compared with about 102,000 tons in 1935. This is an increase of 65 per cent. In spite of the large number of properties worked in 1936, however, 27 mines produced 87 per cent of the total output.

Shipments.—Shipments of fluorspar from domestic mines aggregated 176,231 short tons valued at $3,111,268 in 1936, increases of 42 per cent in quantity and 67 per cent in total value over 1935. Shipments were equivalent to 141 per cent of the average annual tonnage shipped in the 5-year period 1926-30. Of the 1936 shipments, 46,895 tons were shipped by barge for delivery at upper Ohio River landings, compared with 23,800 tons in 1935. The average value of all grades was $17.65 a ton in 1936, or $2.61 more than the 1935 average. The average value per ton of the fluorspar shipped to steel plants from the Illinois-Kentucky district was $16.53 in 1936, compared with $13.76, and from the Chaffee County (Colorado) field was $8.16 a ton in 1936.

Tables 44, 45 and 46 show the details of the shipments of fluorspar by states, by kinds, and by uses in 1935 and 1936. The figures on production in Illinois were collected in cooperation with the Illinois Geological Survey.

TABLE 44.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, 1935-36, BY STATES [a]

State	1935			1936		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Illinois	44,120	$ 686,794	$15.54	82,056	$1,525,606	$18.59
Kentucky	68,679	1,017,451	14.81	80,241	1,409,433	17.56
New Mexico	2,726			2,045		
Nevada	1,040			2,126	60,858	14.59
Colorado	6,978	157,277	14.38	9,412		
New Hampshire	12			257		
Arizona	.....			40	115,371	11.82
Utah	180			54		
Tennessee	6	116	19.33	.....	.....	.....
Total	123,741	1,860,638	15.04	176,231	3,111,268	17.65

[a] U. S. Bureau of Mines, Mineral Market Report No. 548.

4 Data from U. S. Bureau of Mines, Mineral Market Report No. 548.

TABLE 45.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, 1935-36, BY KINDS [a]

Kind	1935			1936		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Gravel	105,460	$1,455,037	$13.80	147,905	$2,421,128	$16.37
Lump	5,268	101,578	19.28	11,967	289,666	24.21
Ground	13,013	304,023	23.36	16,359	400,474	24.48
Total	123,741	1,860,638	15.04	176,231	3,111,268	17.65

[a] U. S. Bureau of Mines, Mineral Market Report No. 548.

Stocks at mines.—The stocks of fluorspar at mines or at shipping points on December 31, 1936, were 53,981 short tons, a decrease of 16 per cent. These stocks consisted of about 24,000 tons of crude fluorspar (calculated to be equivalent to 12,700 tons of ready-to-ship fluorspar) and 29,958 tons of ready-to-ship fluorspar. The stocks at mines or at shipping points on December 31, 1935, were 24,000 tons (revised figure) of crude fluorspar (calculated to be equivalent to 10,700 tons of ready-to-ship fluorspar) and 39,989 tons (revised figure) of ready-to-ship fluorspar.

TABLE 46.—FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, 1935-36, BY USES [a]

Use	1935			1936		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Steel	101,168	$1,392,661	$13.77	141,618	$2,296,792	$16.22
Foundry	2,336	29,068	12.44	2,326	36,729	15.79
Glass	10,256	227,917	22.22	11,014	267,290	24.27
Enamel and vitrolite	4,087	100,686	24.64	5,249	129,206	24.62
Hydrofluoric acid and derivatives	3,333	74,732	22.42	12,627	326,048	25.82
Miscellaneous	2,248	30,923	13.76	3,157	51,124	16.19
Exported	313	4,651	14.86	240	4,079	17.00
Total	123,741	1,860,638	15.04	176,231	3,111,268	17.65

[a] U. S. Bureau of Mines, Mineral Market Report No. 548.

Imports.—The total imports of fluorspar for consumption in the United States were 25,504 short tons (10,028 tons containing more than 97 per cent and 15,476 tons containing 97 per cent or less calcium fluoride) valued at $259,262 in 1936, compared with 16,340 tons (10,578 tons containing more than 97 per cent and 5,762 tons containing 97 per cent or less calcium fluoride) valued at $170,049 in 1935. The imports were equivalent to 14 per cent of the total shipments of domestic fluorspar in 1936 compared with 13 per cent in 1935.

About 61 per cent of the imports in 1936 were metallurgical-gravel fluorspar, 5 per cent ceramic-ground fluorspar, and 34 per cent acid (chiefly lump) fluorspar. The metallurgical-gravel fluorspar was imported from France, Germany, Newfoundland, and Spain; the ceramic-ground fluorspar from Germany and Spain; and the acid-grade fluorspar from Germany, Newfoundland, Spain, and Union of South Africa.

Table 47 compiled from the records of the Bureau of Foreign and Domestic Commerce, shows the imports of fluorspar into the United States by countries in 1935 and 1936.

TABLE 47.—FLUORSPAR IMPORTED INTO THE UNITED STATES, 1935-36, BY COUNTRIES [a]

Country	1935		1936	
	Short tons	Value	Short tons	Value
Canada	1	$14	.....	.....
France	.....	.....	1,595	$16,039
Germany	9,843	119,275	12,943	160,937
Italy	55	589	.....	.....
Newfoundland	.....	.....	4,317	31,497
Spain	5,094	35,432	5,701	31,365
Union of South Africa	1,347	23,739	948	19,424
Total	16,340	179,049	25,504	259,262

[a] U. S. Bureau of Mines, Mineral Market Report No. 548.

Table 48, compiled from data furnished by importers to the Bureau of Mines, shows the quantities of imported fluorspar delivered to consumers in the United States in 1935 and 1936 and the selling price at tidewater (duty paid) irrespective of the year of importation into the United States; it differs from table 47, which shows the quantities received in the United States during 1935 and 1936. The quantities in this table are based on the actual weight ascertained by sworn weighers and represent the weight on which duty was paid and the entries were liquidated.

TABLE 48.—IMPORTED FLUORSPAR DELIVERED TO CONSUMERS IN THE UNITED STATES, 1935-36 [a]

Industry	1935			1936		
	Short tons	Selling price at tidewater, including duty		Short tons	Selling price at tidewater, including duty	
		Total	Average		Total	Average
Steel	5,702	$102,635	$18.00	15,096	$287,454	$19.04
Glass	1,969	49,803	25.29	394	10,397	26.39
Enamel	920	24,447	26.57	544	15,428	28.36
Hydrofluoric acid	7,715	189,794	24.60	8,883	223,419	25.15
Total	16,306	366,679	22.49	24,917	536,698	21.54

[a] U. S. Bureau of Mines, Mineral Market Report No. 548.

Fluorspar consumed and stocked at consumers' plants.—Table 49 shows the consumption of fluorspar in 1935 and 1936 and stocks at consumers' plants at the close of these years.

TABLE 49.—FLUORSPAR CONSUMED AND IN STOCK IN THE UNITED STATES, 1935-36, BY INDUSTRIES, IN SHORT TONS [a]
(Partly estimated by Bureau of Mines)

Industry	1935		1936	
	Consumption	Stocks at consumers' plants Dec. 31	Consumption	Stocks at consumers' plants Dec. 31
Basic open-hearth steel	99,600	47,500	133,900	59,200
Electric-furnace steel	5,400	900	6,900	1,200
Foundry	1,900	800	1,900	700
Ferro-alloys	700	300	800	200
Hydrofluoric acid and derivatives	12,900	5,600	19,300	6,900
Enamel and vitrolite	4,900	900	5,400	1,200
Glass	11,000	1,700	11,600	2,300
Miscellaneous	1,000	300	1,800	900
Total	137,400	58,000	181,600	72,600

[a] U. S. Bureau of Mines, Mineral Market Report No. 548.

PORTLAND CEMENT

Shipments of cement from Illinois mills in 1936 amounted to 4,950,000 barrels, an increase of 51 per cent over the 1935 total shipments. This is the first year since 1930 that total shipments have increased over that of a preceding year. The downward trend of cement shipments from Illinois mills since 1930 and the sharp increase during 1936 is shown in figure 7.

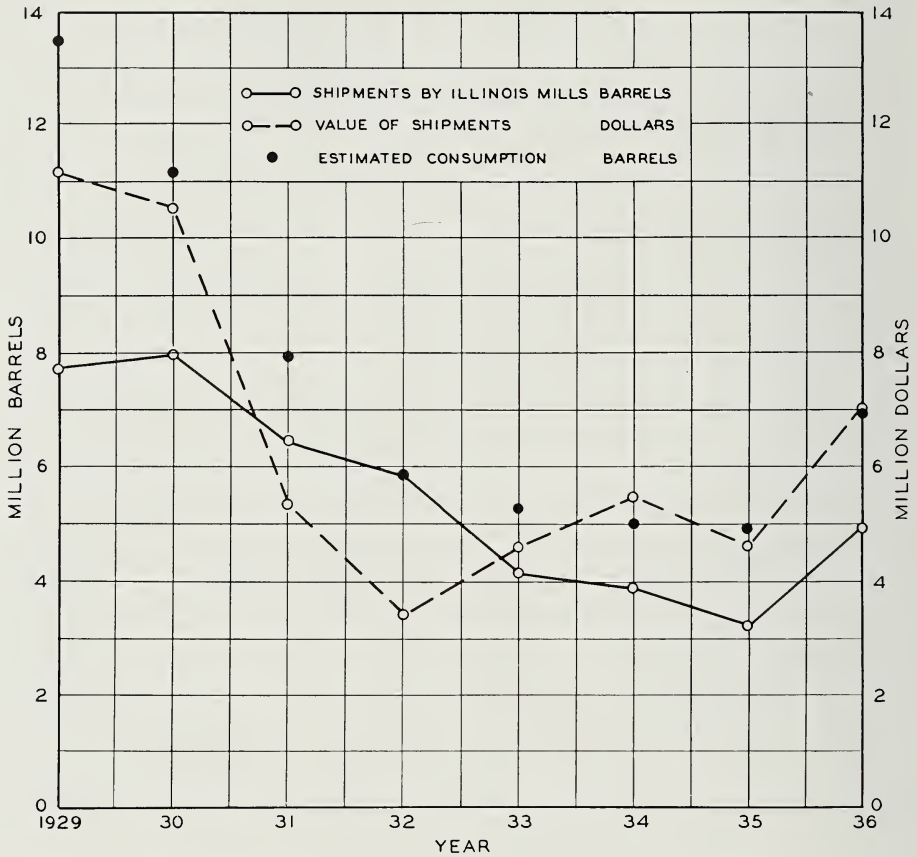

Figure 7.—Cement Shipments, Consumption and Value of Output in Illinois, 1929-1936, by Months.

Value of the shipments was $7,064,000, an increase of 53 per cent over that of 1935. The trend of value of total shipments from Illinois mills, by years, is shown in figure 7. The value per barrel during 1936 was approximately $1.42, an increase of $0.01 since 1935. A comparison of the average factory value per barrel of cement shipped from Illinois mills during the last nine years is shown in table 50.

TABLE 50.—SHIPMENTS OF CEMENT, IN BARRELS, VALUE, AND CONSUMPTION IN ILLINOIS, 1928-36 [a]

Year	Shipments	Value	Average factory value per barrel	Consumption
1928	7,405,667	$11,602,848	$1.57	17,683,269
1929	7,738,208	11,134,538	1.44	13,490,520
1930	7,951,680	10,519,162	1.32	11,164,248
1931	6,425,909	5,342,446	0.83	7,925,435
1932	5,829,687	3,446,482	0.59	5,822,358
1933	4,193,048	4,607,335	1.08	5,281,216
1934	3,908,107	5,498,568	1.40	5,008,440
1935	3,276,970	4,500,897	1.41	4,936,007
1936	4,950,000	7,064,000	1.42	6,980,310

[a] U. S. Bureau of Mines, Monthly Cement Statement No. 177.

Consumption of Portland cement in Illinois increased in 1936 for the first time since 1928. The estimated consumption during 1936 was 6,980,310 barrels, an increase of 42 per cent over the preceding year (table 50 and fig. 7). Figure 8 compares cement consumption in Illinois, by months, for the two years 1935 and 1936. Construction activities and rail shipments were impeded by severe weather conditions during the first two and one-half months of 1936. For the remainder of the year, however, cement consumption was at a much higher level than in 1935, averaging for the year over 170,000 barrels per month increase. Cement consumption, by months, for the years 1934, 1935, and 1936, is shown in table 51.

TABLE 51.—PORTLAND CEMENT CONSUMPTION IN ILLINOIS, 1934-36 [a]
(Barrels)

Month	1934	1935	1936
January	133,420	133,855	123,914
February	99,658	159,240	96,972
March	183,486	304,977	344,791
April	386,683	352,243	502,111
May	671,643	414,793	747,219
June	557,475	460,779	907,061
July	512,159	675,717	872,104
August	545,571	701,896	881,077
September	546,926	627,998	811,715
October	736,326	613,827	913,472
November	476,070	304,021	507,209
December	158,940	183,527	272,665
Total	5,008,357	4,932,873	6,980,310

[a] U. S. Bureau of Mines, Monthly Cement Statements.

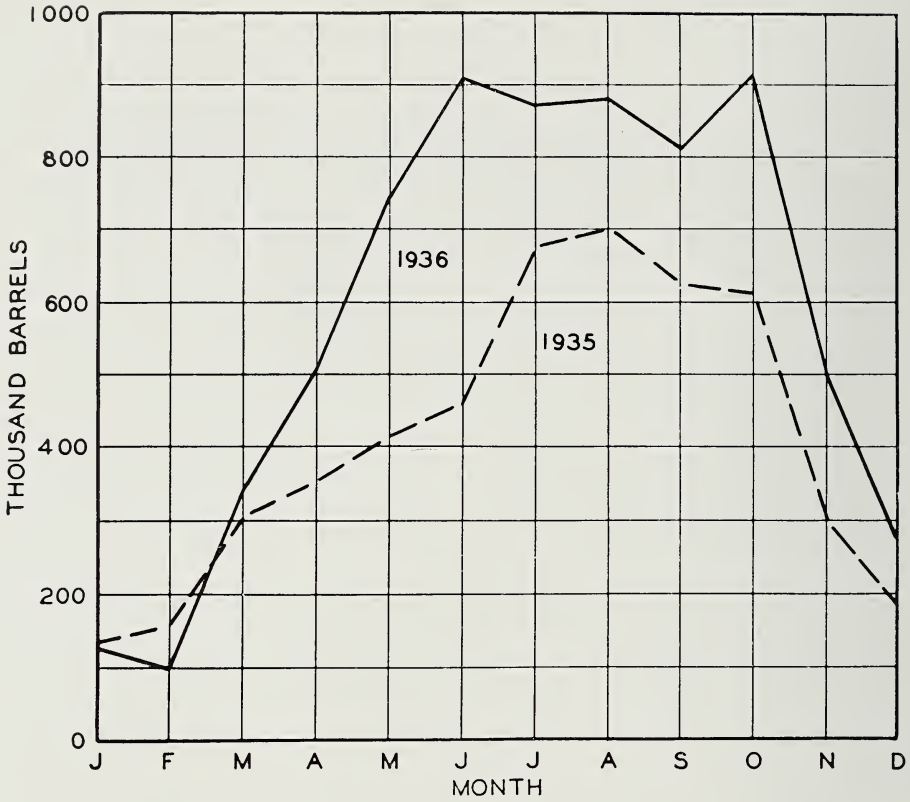

Figure 8.—Cement Consumption in Illinois, 1935-1936, by Months.

OTHER MINERAL PRODUCTS

The distribution and trends of production from 1934 to 1936 of structural non-metallic minerals, by districts, are shown in tables 52 and 53. The districts may be identified by reference to figure 9.

A substantial rise in building activities increased the demand for structural sand and gravel. Continued activity in road building helped to sustain the outlet for sand, gravel, and limestone. The market for agricultural limestone was unusually favorable with a return of agricultural purchasing power and an active soil conservation program.

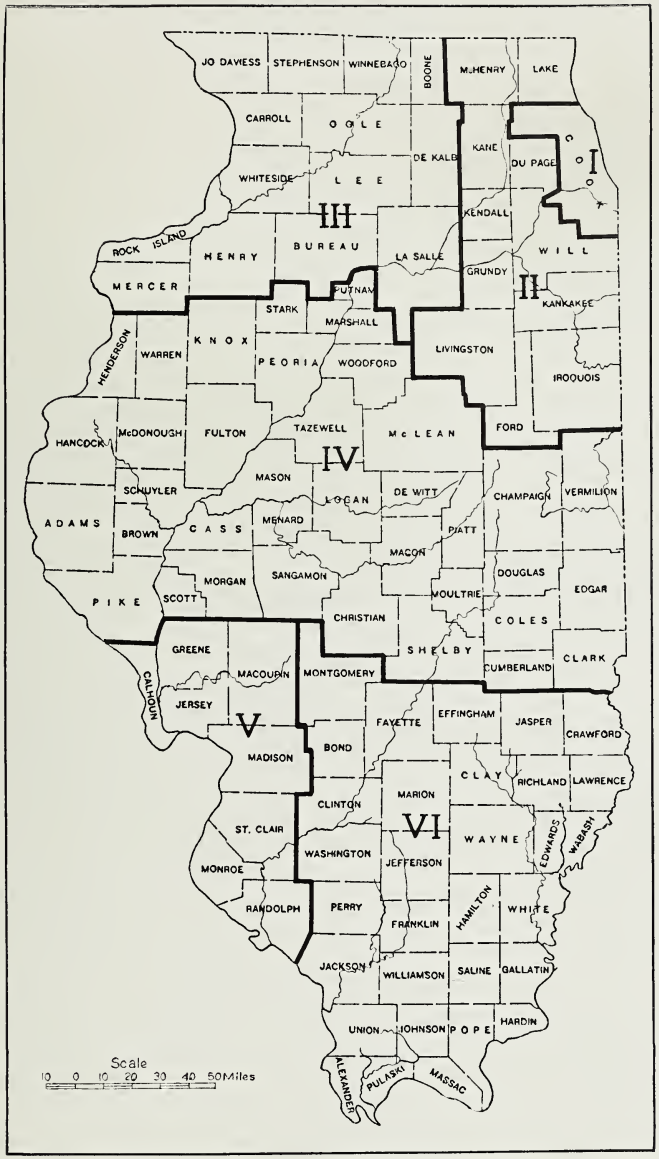

Figure 9.—Index Map of Illinois Showing Location of Districts According to which Production of Sand and Gravel and Limestone, (tables 52 and 53) Is Given.

TABLE 52.—PRODUCTION OF SAND AND GRAVEL BY COMMERCIAL PRODUCERS IN ILLINOIS, BY DISTRICTS, 1934-36

District No. (Fig. 9)	1934		1935		1936	
	Tons	Value	Tons	Value	Tons	Value
Structural Sand						
I, II	152,254	$ 61,102	569,693	$199,084	580,219	$ 214,246
III	124,174	62,236	263,561	84,321	366,493	176,748
IV	149,003	86,760	169,728	82,785	376,406	163,632
V	174,142	88,119	126,935	71,310	78,775	44,334
VI	6,529	4,206	27,958	16,857	113,631	60,775
Paving and Roadmaking Sand						
I, II	468,029	138,252	210,411	76,259	460,694	156,633
III	90,399	45,296	121,501	42,773	289,775	73,458
IV	256,360	125,761	372,627	156,696	515,491	194,992
V	129,084	63,687	(a)	(a)	87,963	48,675
VI	69,833	46,879	48,879	41,767	39,455	26,458
Structural Gravel						
I, II	267,251	113,741	825,082	326,372	688,276	280,133
III	151,172	91,423	234,821	111,458	363,714	170,744
IV	169,700	100,462	268,420	145,586	525,805	231,672
V	(a)	(a)	(a)	(a)	(a)	(a)
VI	9,986	5,561	42,602	24,060	36,106	25,411
Paving and Roadmaking Gravel						
I, II	632,601	227,890	424,338	183,666	1,009,127	351,715
III	228,104	112,166	332,754	152,804	915,074	342,171
IV	350,220	181,942	713,663	334,414	1,348,041	538,540
V	(a)	(a)	(a)	(a)	95,370	47,634
VI	80,263	58,604	88,633	39,845	290,158	155,598
Railroad Ballast Sand and Gravel						
I, II	233,500	79,556	763,584	233,205	841,133	221,865
III	(a)	(a)	(a)	(a)	(a)	(a)
IV	40,654	22,237	71,718	32,739	147,700	59,779
V					(a)	(a)
VI	(a)	(a)	(a)	(a)	(a)	(a)
Other Sand and Gravel						
I, II	172,107	85,624	11,368	5,374	13,431	8,188
III	942,815	1,177,005	1,210,247	1,458,365	1,508,108	1,902,276
IV	20,028	22,699	23,502	25,902	57,267	38,903
V	(a)	(a)	(a)	(a)	26,575	14,645
VI	54,719	30,428	55,851	29,131	57,722	41,336
Total Sand and Gravel						
I, II	1,925,742	706,165	2,804,476	1,023,960	3,592,880	1,232,780
III	1,554,797	1,501,320	2,404,132	1,928,128	3,969,769	2,807,433
IV	1,085,820	591,536	1,619,658	778,122	2,980,710	1,227,518
V	344,680	170,823	347,686	173,624	363,983	195,481
VI	248,428	157,702	304,283	168,966	543,191	312,332
Illinois	5,159,467	3,127,546	7,480,235	4,072,800	11,440,533	5,775,544

[a] Concealed in total; less than three producers.

TABLE 53.—PRODUCTION OF LIMESTONE BY COMMERCIAL PRODUCERS IN ILLINOIS, BY DISTRICTS, 1934-36

District No. (Fig. 9)	1934		1935		1936	
	Tons	Value	Tons	Value	Tons	Value
Road Metal and Concrete						
I	1,102,415	$ 693,510	1,382,970	$ 797,713	3,201,792	$1,642,122
II	515,687	370,156	502,467	353,379	1,028,571	648,159
III	119,533	109,939	178,875	158,385	273,623	136,253
IV	183,668	189,177	93,318	94,450	192,597	180,134
V	641,903	502,272	705,003	606,151	726,112	607,228
VI	104,036	98,349	102,619	96,504	163,957	180,340
Railroad Ballast						
I	96,467	51,234	125,872	62,835	353,500	210,250
II	119,648	89,633	227,764	167,646	180,757	128,288
III	.....	.....	.....	.....	.....	.....
IV	.....	.....	.....	.....	[a]	[a]
V	[a]	[a]	36,010	27,091	45,779	36,773
VI	[a]	[a]	.....	.....	[a]	[a]
Agricultural Limestone						
I	48,400	30,650	34,733	15,858	320,189	223,345
II	76,600	48,661	80,946	54,415	350,833	233,780
III	10,824	9,173	14,154	12,635	13,353	15,535
IV	59,543	47,208	20,369	25,095	64,777	80,505
V	223,596	131,267	165,923	114,255	314,498	261,889
VI	29,845	24,802	34,465	24,677	30,115	25,506
Flux						
I	251,800	142,250	331,774	169,802	[a]	[a]
II	.....	.....	.....	.....	.....	.....
III	.....	.....	.....	.....	.....	.....
IV	1,088	1,584	449	661	[a]	[a]
V	[a]	[a]	4,019	5,104	15,355	7,759
VI	.....	.....	[a]	[a]	[a]	[a]
Rubble and Rip-Rap						
I	[a]	[a]	[a]	[a]	.....	.....
II	[a]	[a]	15,257	16,555	5,519	9,165
III	[a]	[a]	[a]	[a]	[a]	[a]
IV	25,186	15,258	4,695	5,838	25,668	22,400
V	124,507	122,876	112,029	112,526	101,496	108,900
VI	[a]	[a]	[a]	[a]	[a]	[a]
Miscellaneous Limestone						
I	[a]	[a]	[a]	[a]	[a]	[a]
II	[a]	[a]	24,508	32,456	30,866	52,394
III	[a]	[a]	.....	.....	3,095	5,590
IV	8,949	25,321	18,396	40,056	18,647	54,667
V	7,296	26,470	30,877	52,091	117,413	150,014
VI	.....	.....	.....	.....	.....	.....
Total Limestone						
I	1,618,389	1,029,048	2,011,424	1,205,690	4,301,217	2,306,217
II	718,100	518,873	850,042	624,451	1,596,546	1,071,786
III	278,627	126,624	193,429	171,420	323,123	207,388
IV	278,434	278,548	137,227	172,100	306,912	345,652
V	1,013,370	796,724	1,053,861	917,218	1,320,653	1,172,563
VI	141,640	131,834	141,367	126,440	197,649	208,782
Illinois	3,901,560	2,881,651	4,387,350	3,217,319	8,046,200	5,312,388

[a] Concealed in total; less than three producers.